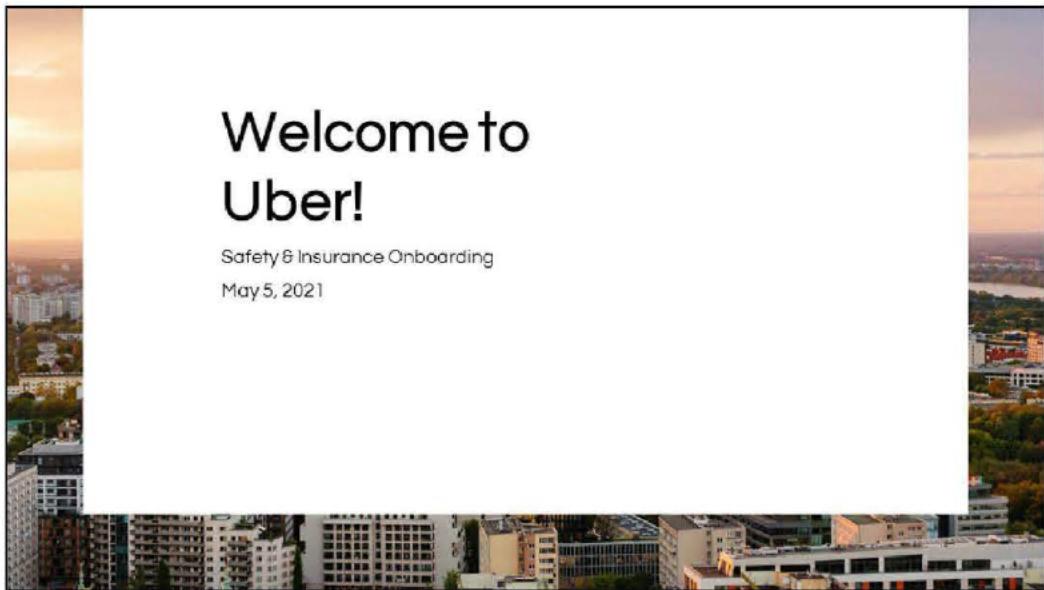


Exhibit C

EXHIBIT 3

EXHIBIT FILED UNDER SEAL

UBER_JCCP_MDL_000475307-UBER_JCCP_MDL_000475485



Today's Topics



- [**01** S&I Overview + Q&A](#)
- [**02** Global Safety Operations](#)
- [**03** Privacy & Legal](#)
- [**04** Incident Taxonomy](#)
- [**05** Analytics](#)
- [**06** Data Science](#)
- [**07** Insurance 101](#)

S&I Overview

Frank Chang

01

Specific to S&I, which is within the broader Core Services Team.

NOTE: welcome to those of you who aren't new to Uber but joined today to learn a bit more about S&I

S&I Overview Topics:



- 01 Onboarding Overview**
- 02 S&I Team**
- 03 S&I Functional Deep Dives**

Safety & Insurance

Your Onboarding Experience

Uber
Safety & Insurance

Today's Sessions	1:1 Sessions	Ubiversity	Functional Training
Covers important topics and teams within Safety & Insurance	Covers your team and role, between you + your Manager	Covers important topics and teams within Uber	Covers skills, tools, and processes for your functional role

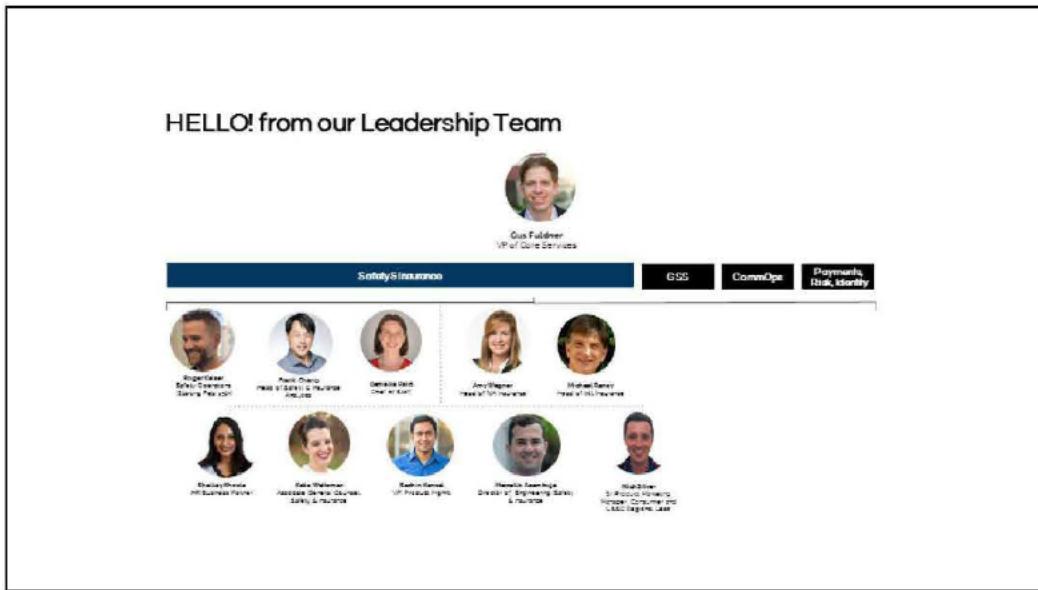
Our cultural norms

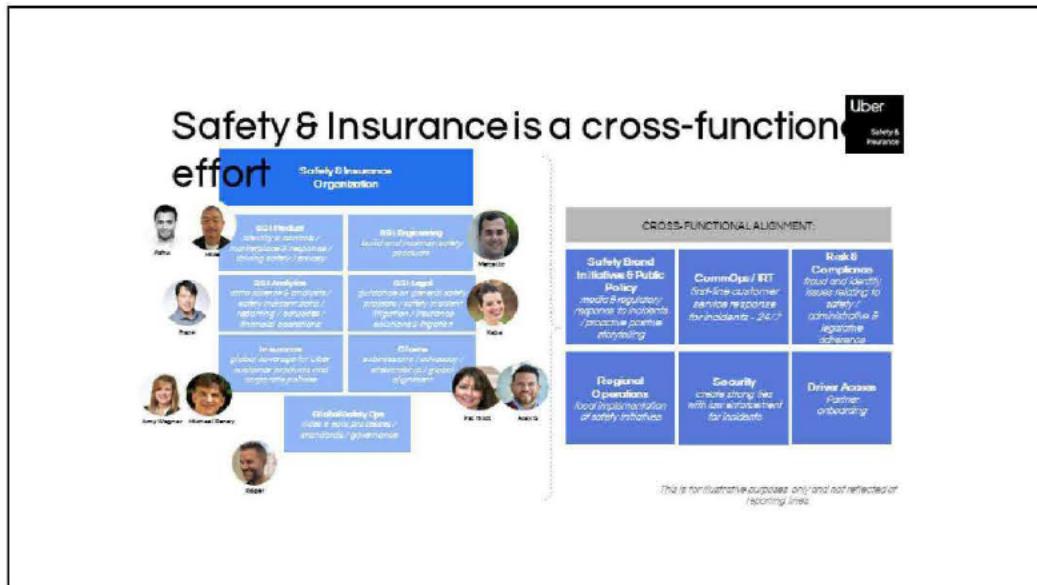
The slide features a title 'Our cultural norms' at the top left. In the top right corner is the Uber logo with the text 'Safety & Insurance' underneath. Below the title is a 2x4 grid of eight colored boxes, each containing a cultural norm statement. The colors of the boxes are: top row: blue, dark blue, orange, dark grey; bottom row: purple, pink, green, orange. Each box contains a single sentence. At the bottom left of the grid, there is a small, faint text 'Uber | People & Culture'.

We do the right thing. Period.	We act like owners.	We make big bold bets.	We value ideas over hierarchy.
We celebrate differences.	We build globally, we live locally.	We are customer obsessed.	We persevere.

Uber | People & Culture

Welcome to Safety &
Insurance





Brand and Policy - Safety Incidents happen and are often in the media; coordinating a public response. Safety Report

CommOps / IRT - How to respond with empathy when something goes wrong? How to deal with interpersonal conflict - PLUG VIRTUAL HQ COE.

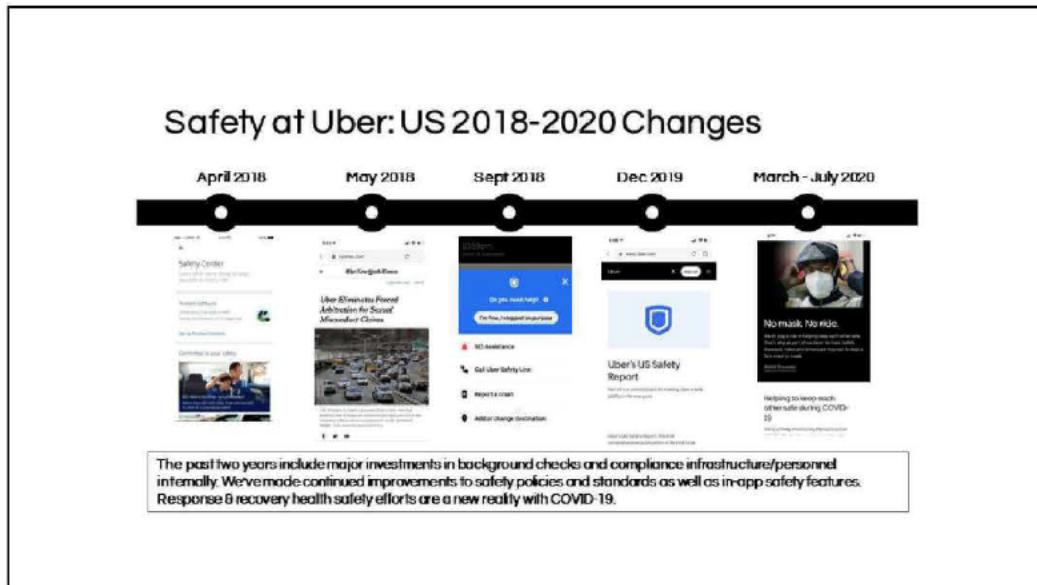
Continuing on for the fourth year as a company priority



Stand for Safety

Mission

Make Uber the **safest** and the **most trusted** transportation choice, and support our customers with **empathy** and **care** if things go wrong.



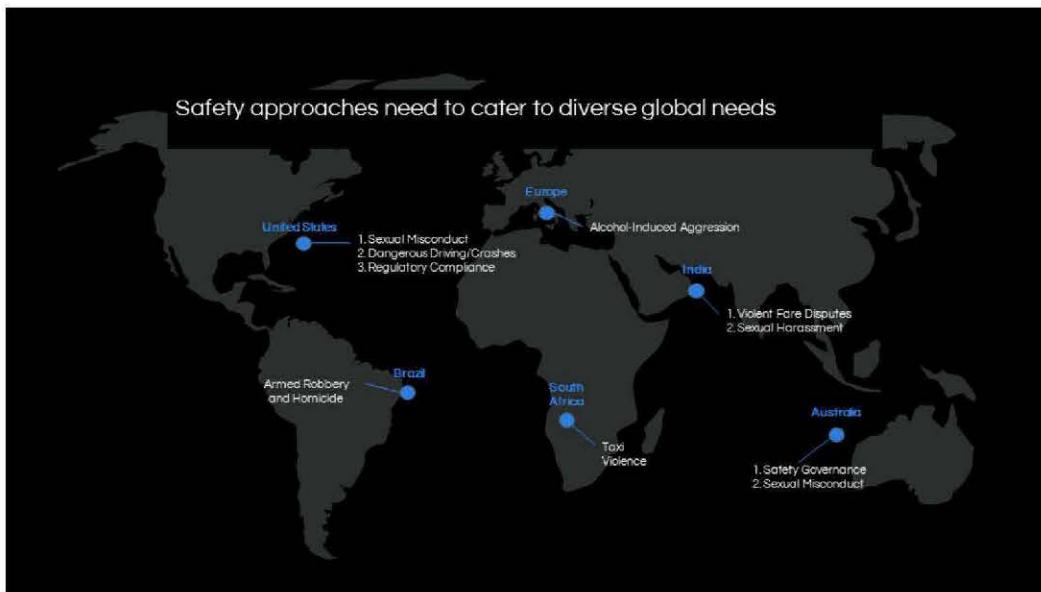
2021 Changes

Continue to lead the new standard for safety in our COVID-19 response



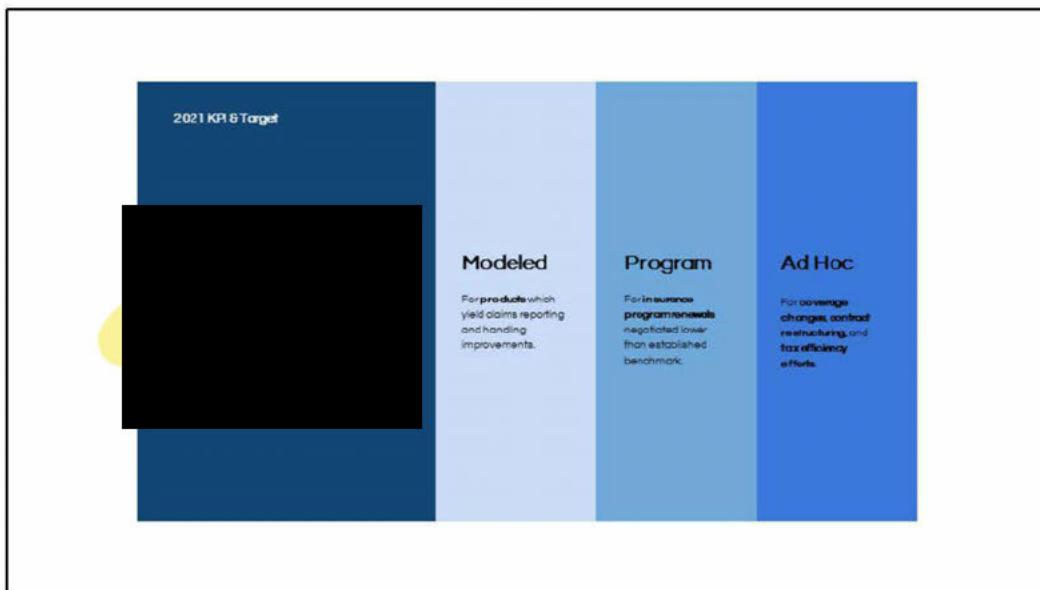
Two Wheeler Safety Incident reduction Peace of Mind Health Safety

- Sudden changes in the world required us to react and respond quickly
- In addition to reducing existing incidents, monitor and keep our users safe during COVID

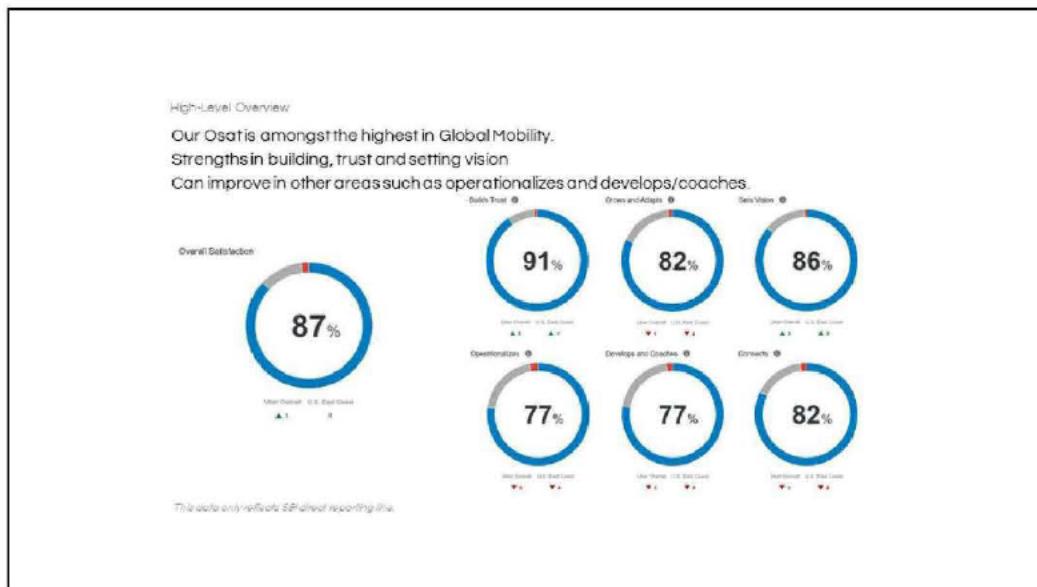


KPIs

2021 Company Priority Stand for Safety KPIs and Targets →			
Reduce Global Safety Incident Rate	Improve Global Safety Perception	Improve Promotes Hygienic Behavior Perception	
Motor Fatality -5%	Riders: 43% (+6)	Riders: 48% (+5)	
Physical Assault Fatality -10%	Drivers: 43% (+5)	Drivers: 50% (+5)	
Critical Sexual Assaults -10%*	Gen Pop: 30% maintain	1H2021 only 9 will re-evaluate in H2	







Lowest Scoring Themes		
Delegate x could delegate more and allow his team to take on more ownership and responsibility even that means small sacrifice or detour on business outcomes (hopefully not). There are always going to be fire drills, but the role of a manager is putting structure and empowering the team to de-prioritize other workstreams. My manager could delegate authority to others more often.	Connect Work on connecting more across pillars and teams. Very siloed and less connected any chart. Provide opportunities to stay connected for non business related topics and keep us being the close team that we were when we worked together at the office. My manager could encourage team members to be more actively involved in discussions with leaders from other areas and even facilitate these interactions. It would be a good opportunity for the team to connect with other senior colleagues and make us even prouder of our work.	Sets Vision Give clearer guidance on team's objectives. Set firmer expectations and timelines. Share his vision with the team and how it fits in with the other partner teams like product and eng.
<small>This data only reflects 59 rated reporting lines.</small>		

Highest Scoring Themes		
Builds Trust <small>(S/he) builds trust and collaboration both within and outside the team. Provides flexibility and support for the team members.</small> <small>Set clear goals and expectations gives the team as much freedom as possible, builds trust. Is part of the team.</small> <small>We can speak candidly with him and he is honest and straightforward with his feedback. This builds trust for our immediate team, which is critical since there are sometimes trust issues working cross functionally with other teams.</small> <small>My manager does a great job creating a safe workplace where I can be my genuine self, listening to my concerns, and trying to assign me projects that excite me.</small>	Listens <small>Good at listening and assumes the best intentions. This helps when dealing with difficult situations and challenging relationships.</small> <small>She is very approachable and will stop to listen to any questions or concerns I have even during days where I know her schedule is packed and I am likely working late.</small> <small>The kind of person you can call about anything and he will calmly listen and thoughtfully respond. This has made him an especially valuable manager to have during COVID2020.</small>	Feedback <small>Has done a great job of continuing to communicate effectively and thoroughly as we've moved to work from home and has maintained a great feedback loop for us all.</small> <small>My manager listens to feedback and is an advocate for me.</small>
<small>This data only reflects 59 valid reporting lines.</small>		

Events Around S&I



- Quarterly Coffee Chats
- Key Event Coming up:
 - S&I Mental Health & Wellness LIVE Webinar
 - Date:
 - Time:
 - Zoom



21

Slide 21

2 **Update.**

Darlene Ordonez, 4/27/2021

1 **Yes, please!**

Frank Chang, 4/27/2021

1 **date and time TBD**

Darlene Ordonez, 4/28/2021

S&I Team Overviews

S&I Data & Analytics

661 Analytics

Team Overview

Mission We provide insights and analytical solutions that are timely, accurate, and actionable to drive safety and deliver insurance.

Functions	Actuarial Data Analytics	Insurance Finance Data Science Project Management
Sample Projects	7/1 Insurance Policy Renewal Reserve Reviews Audited Safety Incidents Data Product Analytics	SHRAD Regulatory and Privacy/Compliance Litigation Investigation Deactivation policies



S&I Legal

681 Legal

Team Overview

Mission Innovate within the legal industry to drive safety measures, insurance solutions and litigation strategies to help support the communities we serve.

Functions Safety/Legal, Insurance Law, Insurance Litigation

Stats

 70	 120+	 ~5,000	 ~800
--	--	--	--



Insurance & Claims

Insurance & Claims Team Overview

Mission

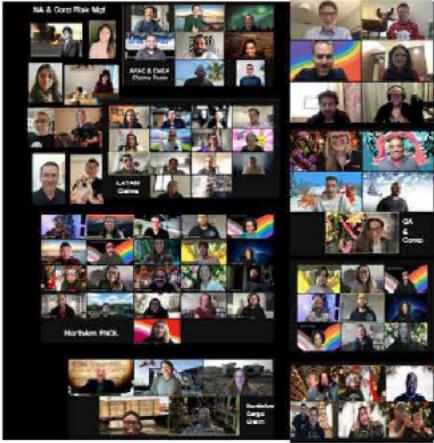
- Provide the right protection and service at the right price while enhancing our business by providing peace of mind and enabling growth.

Functions

- Insurance Business
- Claims

Stats

- Support customers across Rides, Delivery, and expansion products
- Scope: Trips & Deliveries, Cyber, D&O, Liability, WC, Property, Freight, other corporate and miscellaneous insurance for Uber
- 80+ team members



S&I Tech

561 Tech

Team Overview

Mission
Leveraging tech to make Uber the safest and the most trusted transportation and delivery choice, and support our customers with empathy and care when things go wrong.

Functions
Product Management
Engineering (Mobile, BE, Data, TPM)
Product Operations

Stats

	3	139
	>120	



S&I Policy & Comms

Safety Policy & Comms

Team Overview

Mission
Position Uber as an innovative leader on safety, tech and policy with press, consumers, thought leaders, and policy makers.

Functions
Media relations and strategy
Public policy & regs
Thought leadership & third party groups

Stats
5 HQ/USBG
10 International
780+ Media inquiries on COVID-19
Feb/March 2020
6 Central Safety Policy Team
78K Free rides to survivors of Domestic Violence

S&I Marketing

661 Marketing

Team Overview

Mission Set the universal standard for health and safety in ridehailing and food delivery.

Functions Product Marketing

Stats

20+ Health & safety campaigns launched in 2020	61 Countries that have launched the Door-to-Door Safety Standard
37 Countries with cleaning brand partnerships	15 Marketing toolkits adopted globally in 2020 and H1'21



Global Safety Operations

Safety Operations Team Overview

Mission Lead the industry and set the global standard in delivery and rideshare safety through operational excellence and innovation.

Teams APAC Safety, EMEA Safety, Latam Safety, USBC Safety, Central Safety

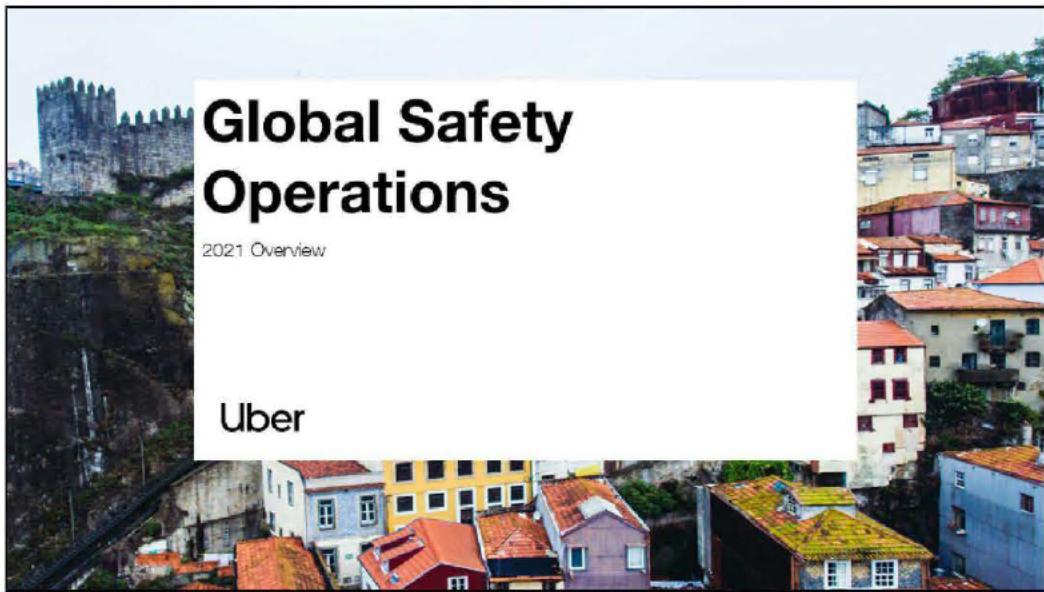
Stats 35 million Masks distributed, 9 million Drivers received free PPE, 315k Drivers Received SAV/SM education, 280k drivers Took uSights



Safety Ops

Roger Kaiser

02

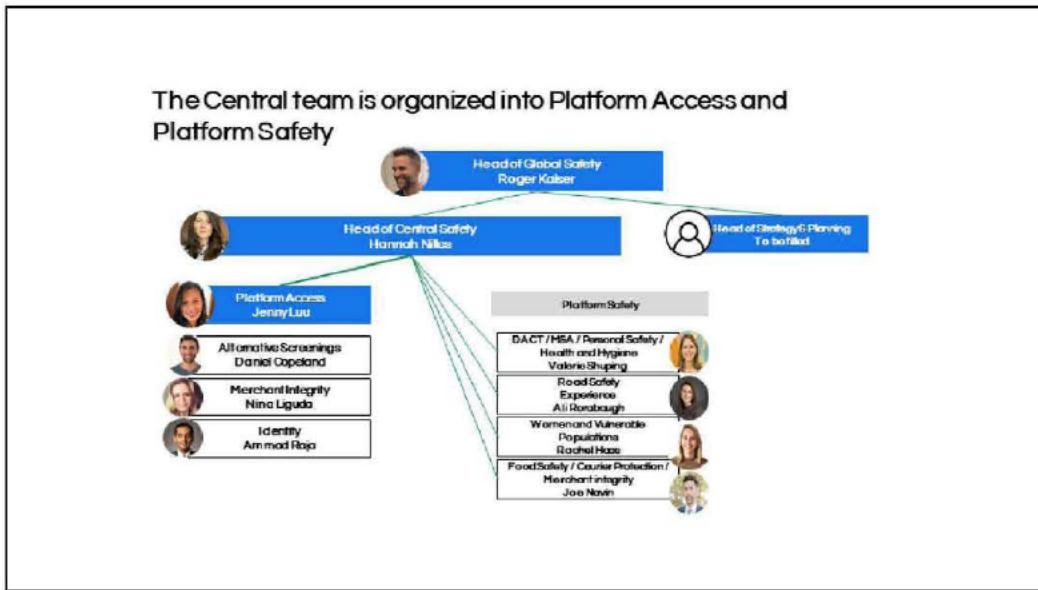


Global Safety Operations was created to unify our safety approach globally and connect HQ and mega-regional efforts

- Though each mega-region has unique safety issues, there is overlap when it comes to platform access, incident response, and safety standards
- Global Safety Ops facilitates mega-regional collaborations, sets global safety priorities, and implements global safety projects.









Highlighted projects

1. Access Compliance

Background Checks
Documents
Photos

uSights are in-house psychometric assessments, helpful where we don't have access to quality BGCs

- uSights is aimed at evaluating attitudes and behaviors that Uber has determined have an important impact on the safety of the platform
- Recently, Uber hired ET3 (a highly reputable and rigorous testing non-profit) to conduct an independent validation of the uSights tool. With a positive report, Uber has the ability to proactively and/or reactively communicate about the tool across all markets where uSights is live or will be launched.



A screenshot of the Uber uSights tool interface. The page title is 'Uber' and the sub-section is 'Avaliação da conduta de motoristas Uber'. The text on the page reads: 'Avaliação da conduta de motoristas Uber é normal. Essa é uma avaliação de desempenho e também mostra como seu motorista desempenha quando está no trabalho.' Below this is a progress bar with the text 'Perguntas de segurança' and 'Respondeu 1 pergunta para concluir a avaliação de segurança' and 'Data de previsão de conclusão: 03 meses'.

Uma questão de segurança.

Global Safety Ops consulted Safety Product on Women Rider Preferred eligibility

2. Trip Experience

- We often work with the product team to determine product eligibility, usage, or other standards
- In this case, we consulted on how product eligibility should be determined, balancing sensitivity around gender identity with potential abuse of the product

I've updated my gender identity

Thank you for updating your gender identity. We also saw your gender update message and are updating our system to reflect this. You can learn more about this feature [here](#).

Please let us know if you have any questions or concerns. Our Customer Support team is available to help.

Reply



4. Safety Commitment

Safety Sentiment
Education
Community

Uber partnered with RAINN to create a dedicated hotline for sexual assault survivors



Trust & Safety investigators refer eligible users to **dedicated hotline** managed by RAINN support specialists

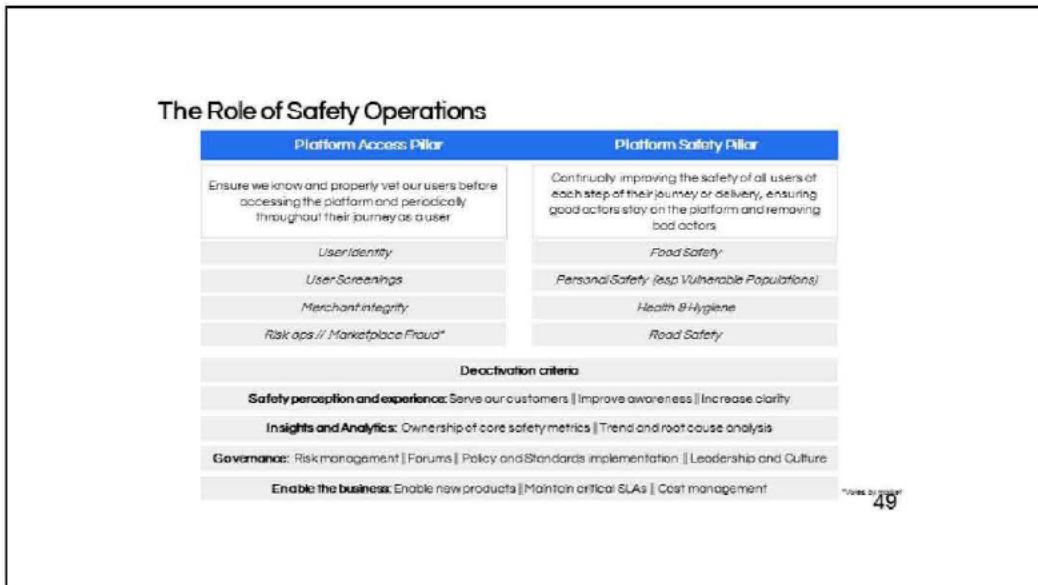


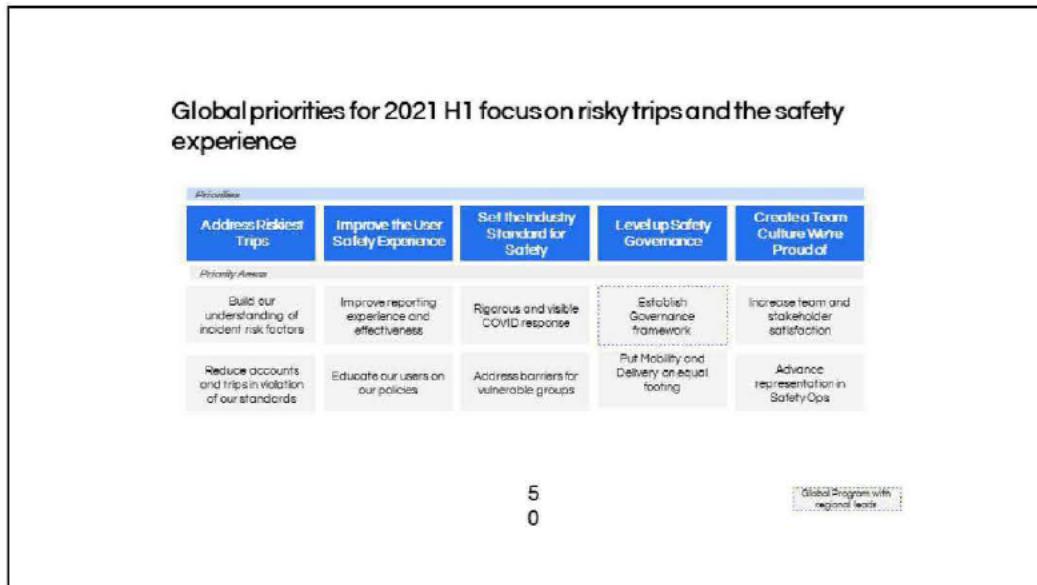
RAINN provides users with free, confidential crisis support and help navigating options related to short- and long-term support (e.g. therapy, service providers, reporting to law enforcement)



Access to immediate financial support for resources such as trauma-informed therapy

2021 Priorities





Safety Legal

Erin Novak

03

Safety Legal for S&I nUbers

May 5, 2021

Uber



REDACTED - PRIVILEGED

ATTORNEY CLIENT PRIVILEGED & CONFIDENTIAL

REDACTED - PRIVILEGED

ATTORNEY-CLIENT PRIVILEGED & CONFIDENTIAL

REDACTED - PRIVILEGED

ATTORNEY CLIENT PRIVILEGED & CONFIDENTIAL

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Incident Taxonomy

Ashutosh Karandikar

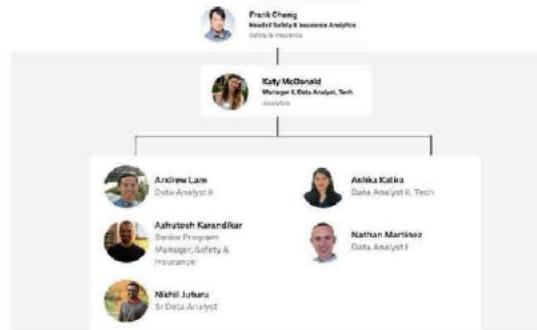
04

Agenda

- 01** Incident Analytics Team
- 02** Life of a Safety Incident @Uber
- 03** Getting Involved

Incident Analytics Team

Meet the Team



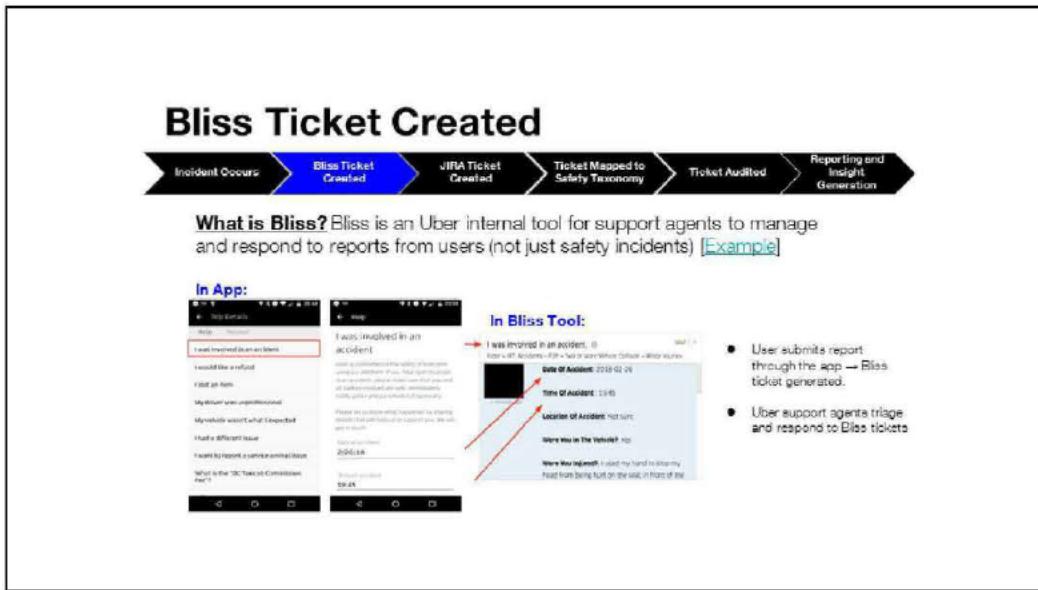
Our Mission

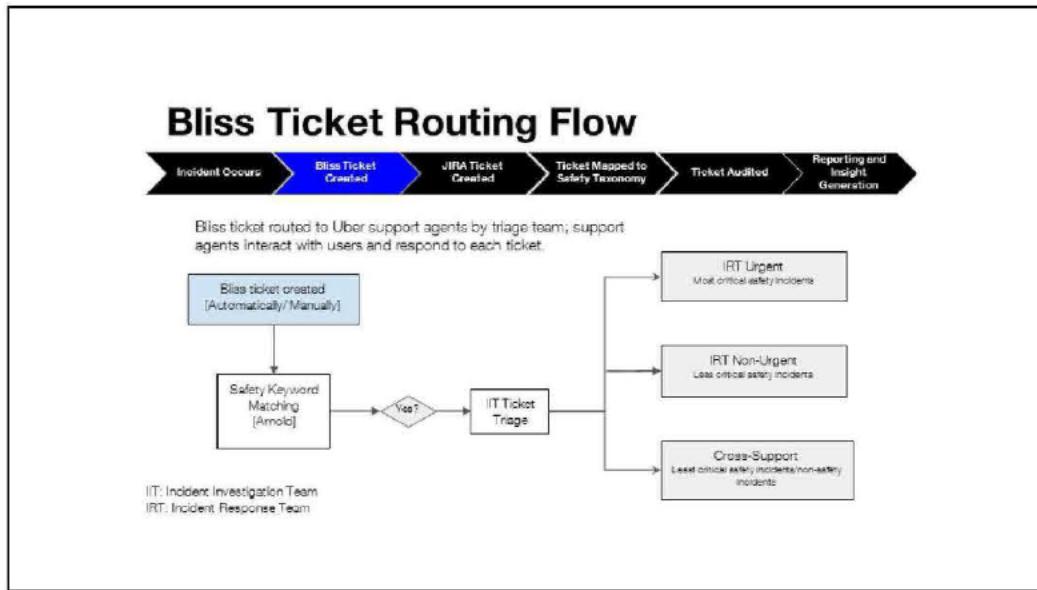
“A trusted resource to enrich, monitor, investigate, advise, and report safety incident data to empower partner teams to take smart, targeted actions which reduce safety incidents”

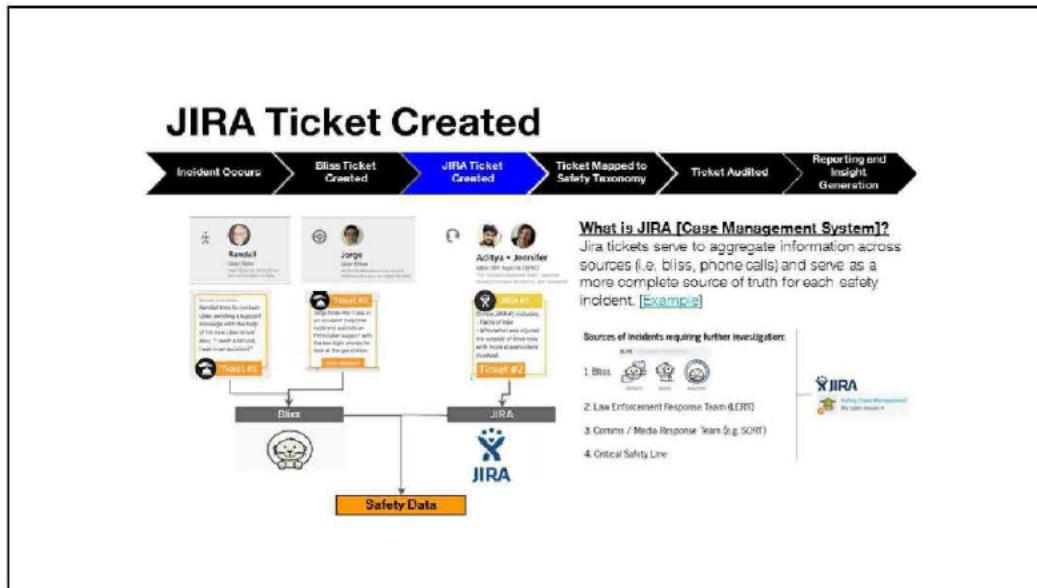
If you discover any inconsistencies in your safety data, please reach out to us at safety-insurance-incident-analytics@uber.com

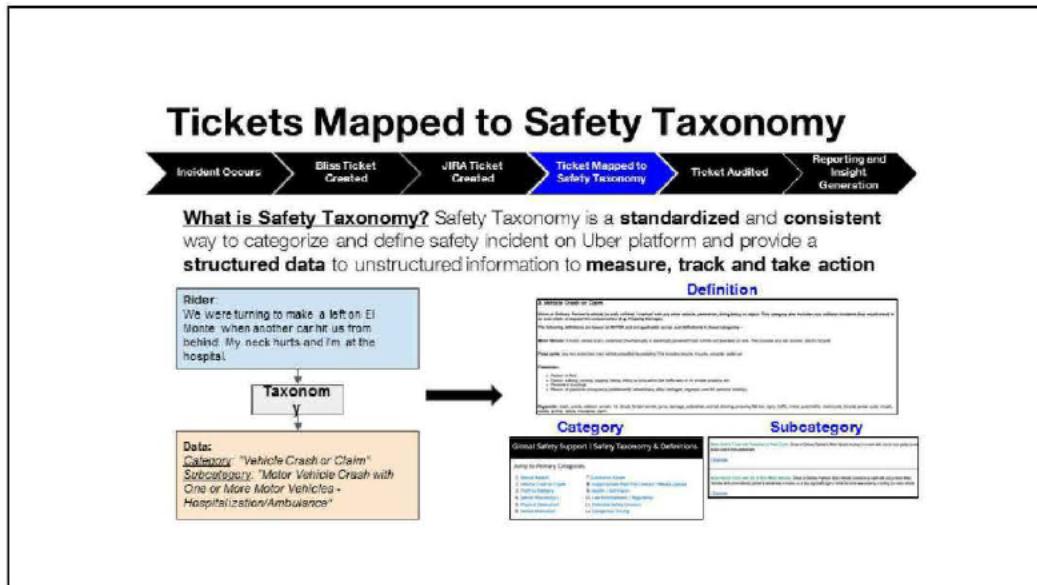
Life of a Safety Incident
@Uber

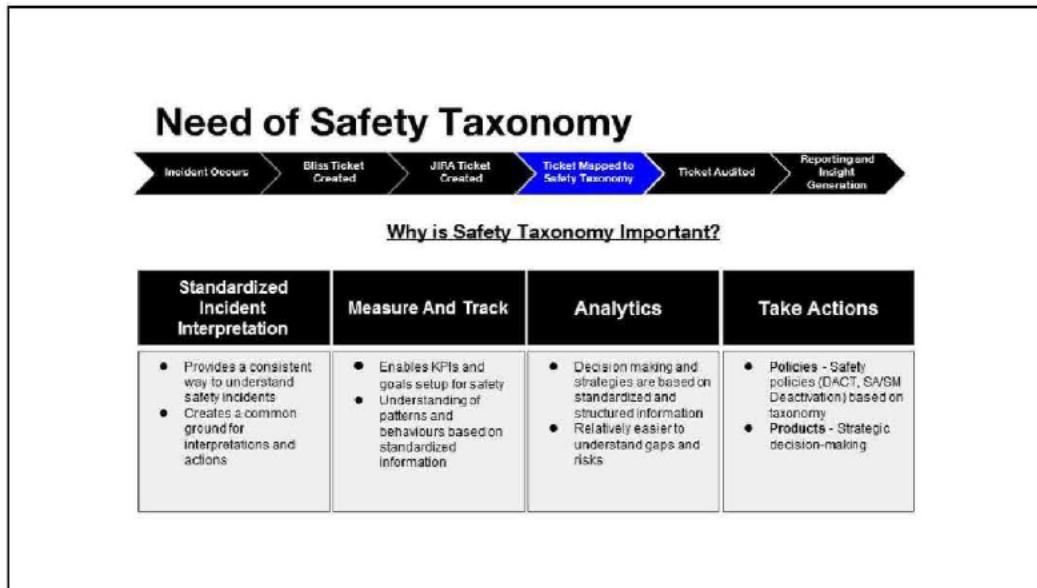






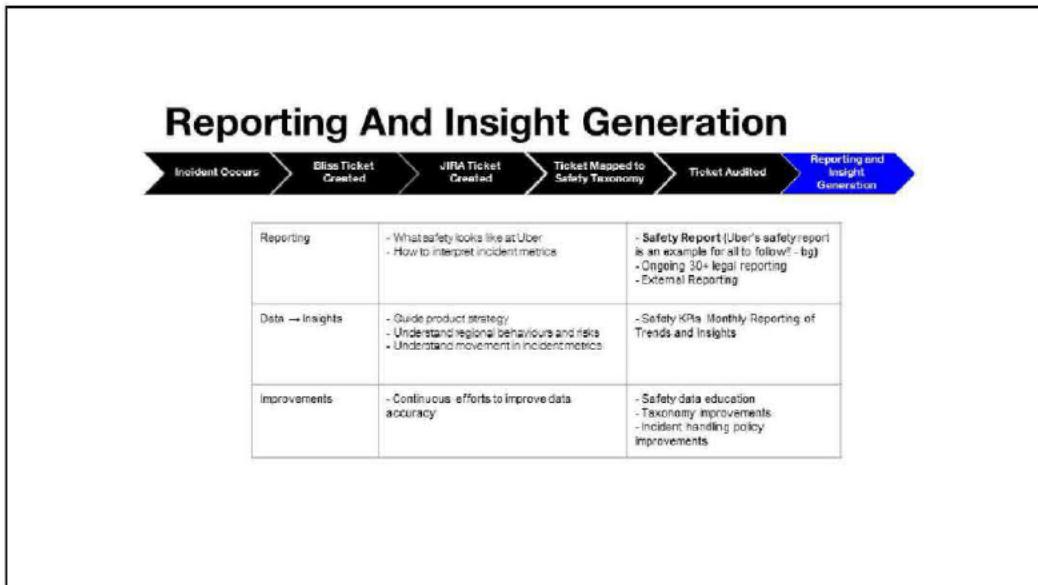












[Example] Safety Report

The New York Post

Uber Says 3,000 Sexual Assaults Were Reported in U.S. Rides Last Year

In a move to increase transparency around sexual assault, ride-hailing giant Uber disclosed 3,000 reports of sexual assault in its long-awaited safety study.



Photo: AP Photo/Mark Lennihan

The Washington Post

Uber discloses 3,000 reports of sexual assault on U.S. rides last year in its long-awaited safety study

► BUSINESS

Uber releases safety report revealing 5,981 incidents of sexual assault

By Associated Press Writer, Associated Press Writer



What went in to this report? Detailed statistics of Uber safety incidents... calculated on top of **cleaned, audited** safety data.

US Safety Report

[Report Link](#)

Getting Involved

Taxonomy-related code review

- Please include [IWA team](#) in code review for taxonomy-related queries with "medium" impact or greater (use judgment, arron side etasking for review)

Incident Analytics office hours

- Bi-weekly IA office hours for answering questions on taxonomy & other safety items
- [Zoom link](#) (On Wednesday every two weeks, reach out to [IWA team](#) if you need an invite)

Taxonomy change announcements

- Taxonomy changes impacting safety data will be emailed to you as they occur

Review tickets

- Highly suggest reviewing tickets before analyses to build familiarity w/ specific incident types. Can aid in unlock analyses

Resources

- Tools ([Get Beta Access](#), [JIRA](#))
- Taxonomy ([Roles](#), [EATs](#), [Invalid Definition](#))
- Incident Rate Methodology ([Roles](#), [EATs](#))

Analytics

Jheel Doshi (@Jheel)

05

Who We Are



Sunny Wong
Manager, Data Science



Jianjin Wang
Business Intelligence Analyst



Alessandro Araujo
Data Analyst



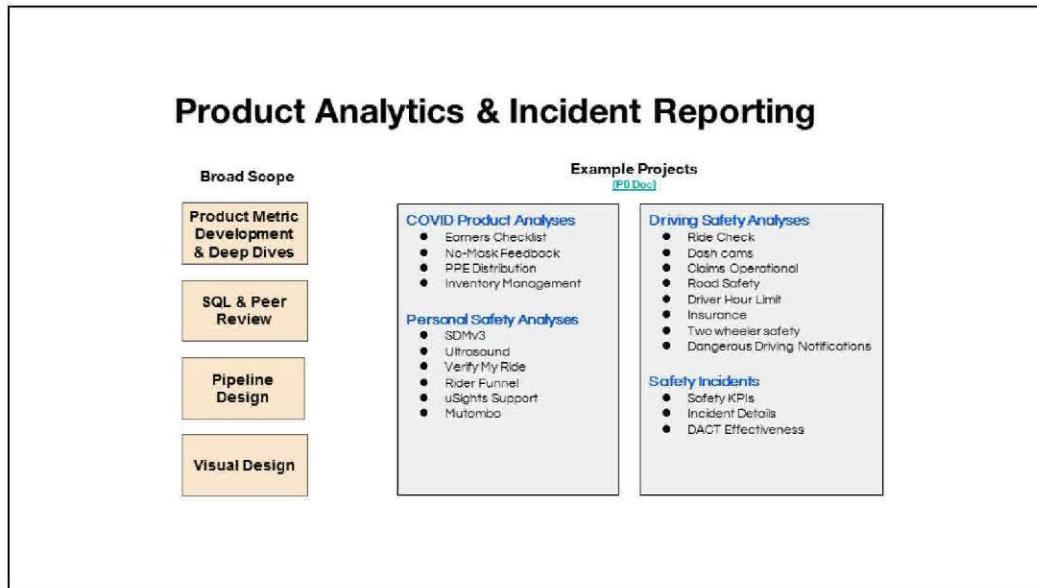
Venun Hanchekar
Manager, Data Analytics



Jheel Doshi
Business Intelligence Analyst



Kewei Chen
Data Analyst





Example: Safety Incident Reporting

Safety KPI Dashboard

Dashboard shows Incident Rates for Critical Auto Crash & Critical Interpersonal Conflicts broken out by audited regions and site. Includes 2020 goals. **Audited Data ONLY.**

Top KPIs

1. Critical Motor Fatalities
2. Critical Physical Assault Fatalities
3. Critical Sexual Assault

Incident Detail

Self-Service Dashboard allows for users to deep dive into incident sub-categories. Critical, as well as cash/non-cash trips, includes Audited and Un-Audited data.

E.g. of Metrics

1. Incident Rate By Geography
2. Incident Rate By Category
3. Incident Rate for Cash vs No Cash Trips

DACT

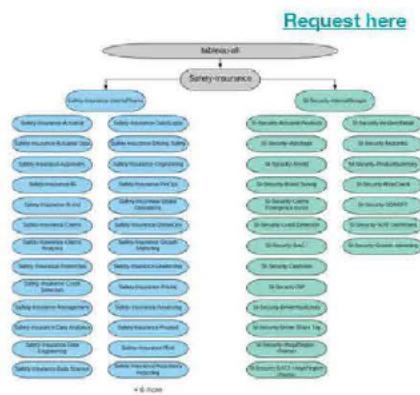
Self-Service Dashboard allows for users to deep dive into deactivation rates for riders and drivers.

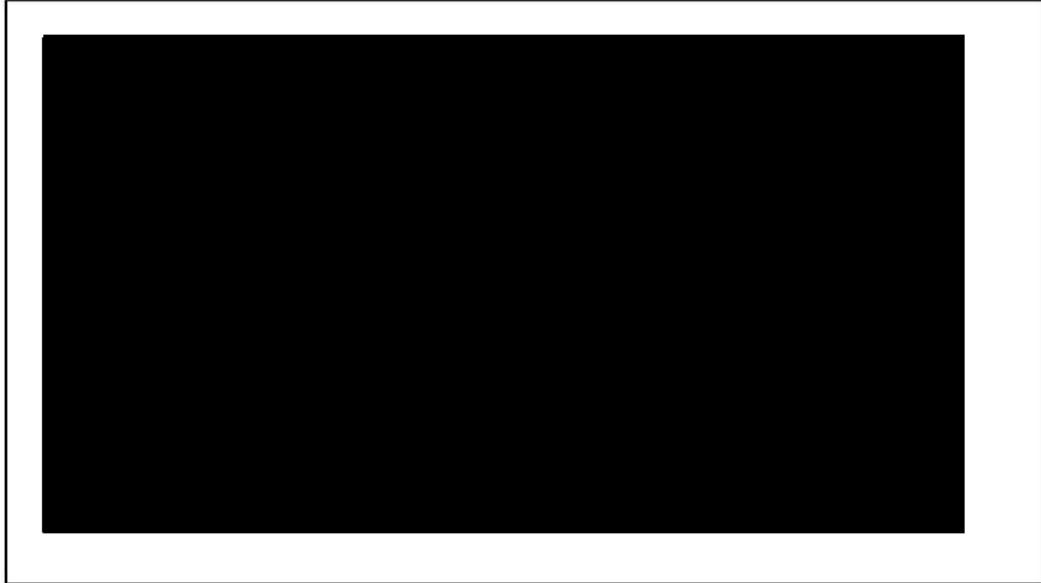
E.g. of Metrics

1. Deactivation %
2. Dact Flagging Rate
3. Ticket Count by Region

Permissions

- Our team also enables Tableau permissioning to different groups within S&L.
- For the internal groups within S&L, make sure you're added to a group from the **left**.
- For our partners from other teams, permission can be granted by the specific dash from the **right**.





Useful Links

- S&I Onboarding Doc: [Link](#)
- S&I Secure Hive Onboarding Doc: [Link](#)
- Summary Dash: [Link](#)
- [Hive Sync](#)
- [Piper](#)
- [Sourcegraph](#)
- Tableau Onboarding: [Link](#)
- Beeline: [Link](#)
- Slack @neel to be added to slack channel for different products such as #querybuilder, #tableau-user

Data Science

Robert Kyle

07

Team



Abbas Hooshmand
Sr. Data Scientist



Gorkem Ozkays
Sr. Data Scientist II



Jing Zen
Sr. Data Scientist



Louis Remus
Data Scientist II



Patrick Muhs
Manager II



Robert Kyle
Sr. Data Scientist

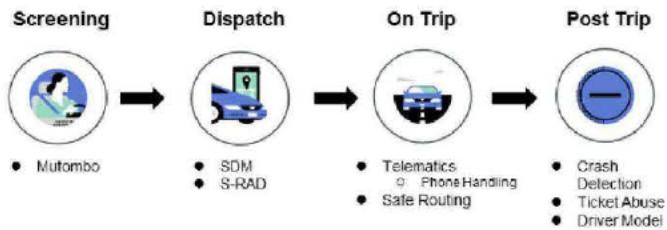


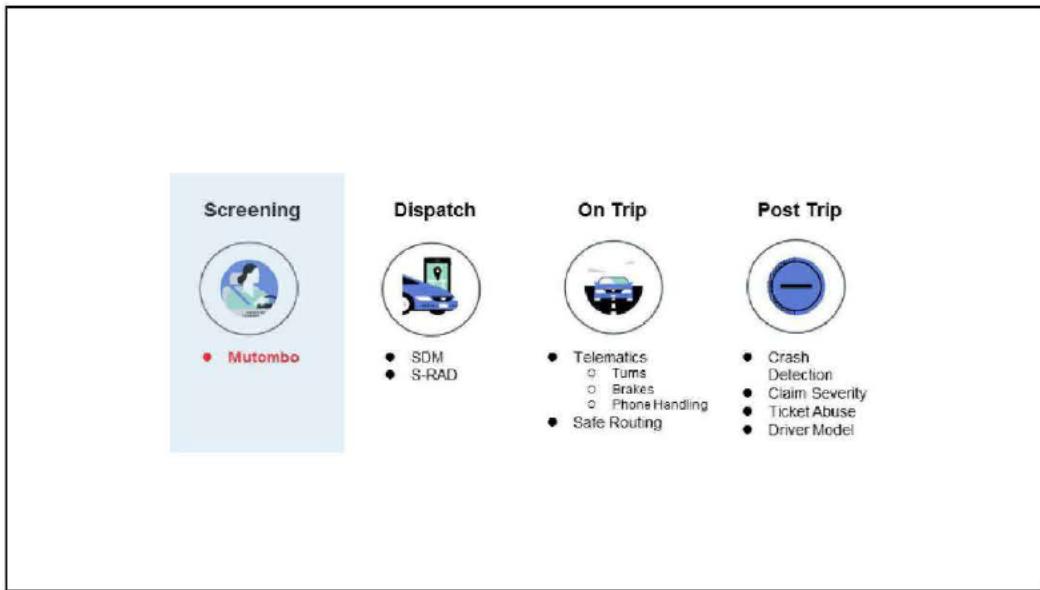
Wayne Zheng
Sr. Data Scientist

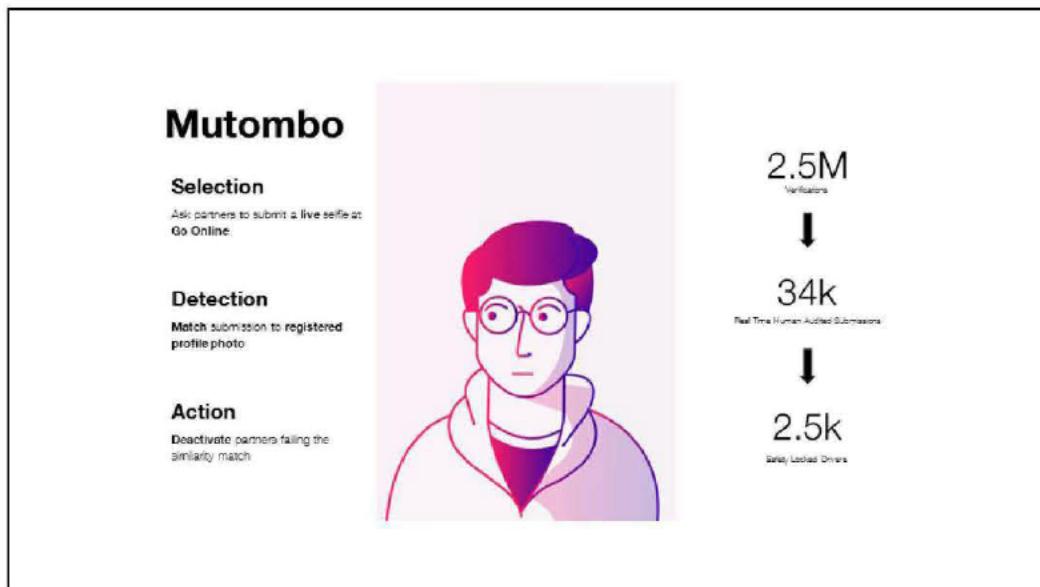


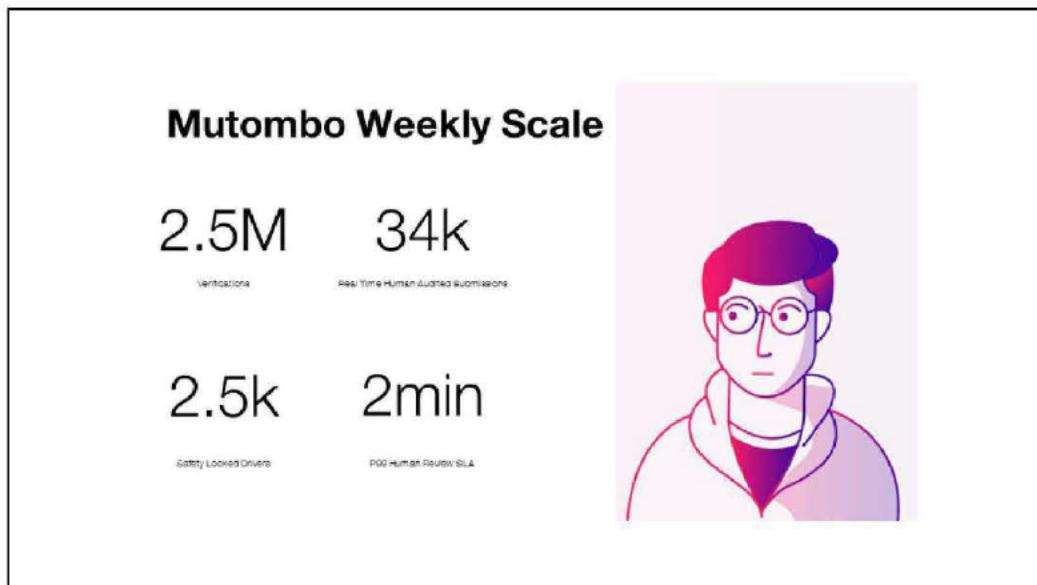
Danni Lu
Data Scientist II

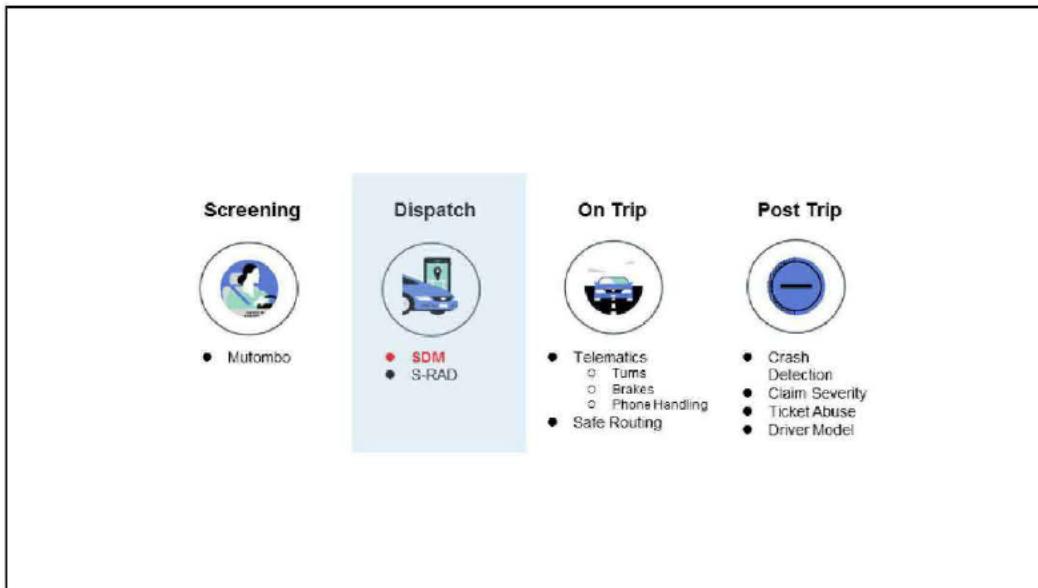
Projects







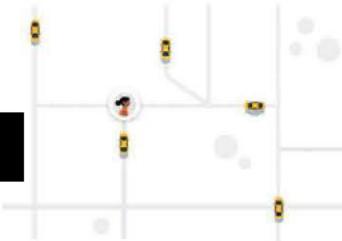




Safe Dispatch

Motivating question:

- How can we realize the human and economic benefits of cash while simultaneously raising the bar on safety?



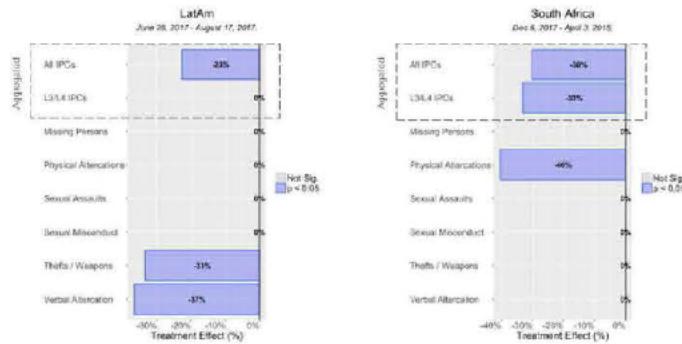
Safe Dispatch Model (SDM):

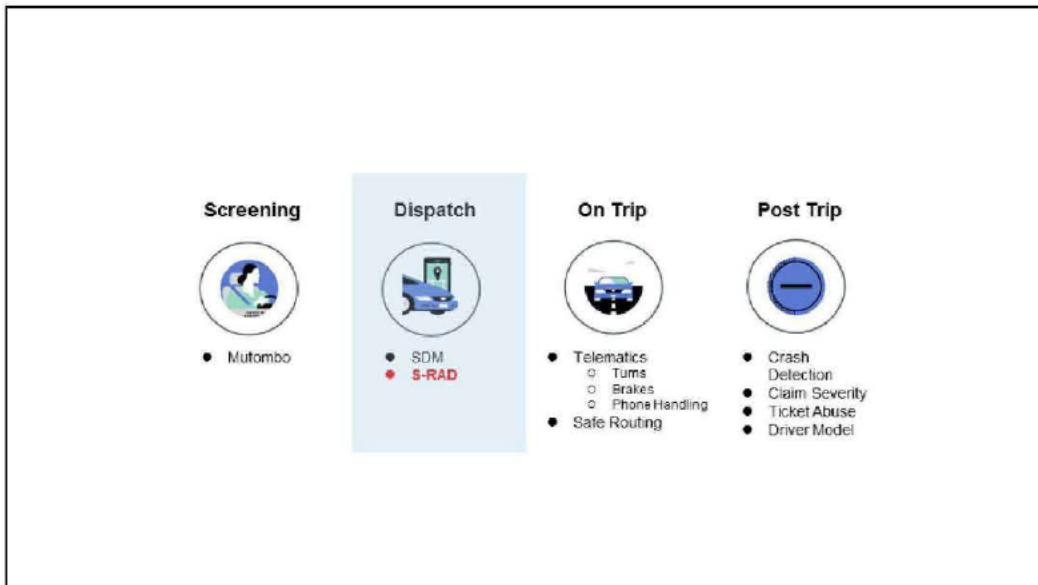
- Leverage machine learning to detect and block potentially malicious cash trip requests in real-time
- Latent [REDACTED]
- South Africa [REDACTED]

Safety Risk Assessed Dispatch (SRAD):

- Identify driver-rider matches with elevated risk using machine learning
 - User data (feedback, account info, gender)
 - Request attributes (time, location, product)
- Down-rank matches with elevated risk at point of dispatch

Reduction in Interpersonal Conflicts





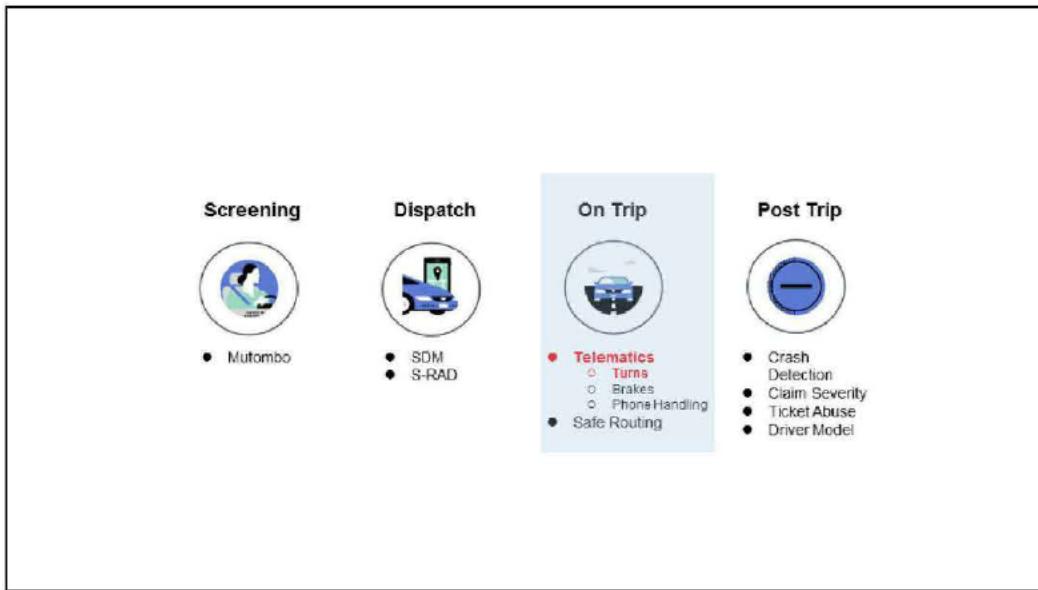
Safety Risk Assessed Dispatch (S-RAD)

Prevent sexual assaults by:

1. Identifying **driver-rider matches with elevated risk** using machine learning
 - a. User data (feedback, account info, gender)
 - b. Request attributes (time, location, product)
2. **Down-rank** matches with elevated risk at point of dispatch



Attorney-Client Privileged



Which one is more dangerous?



vs.

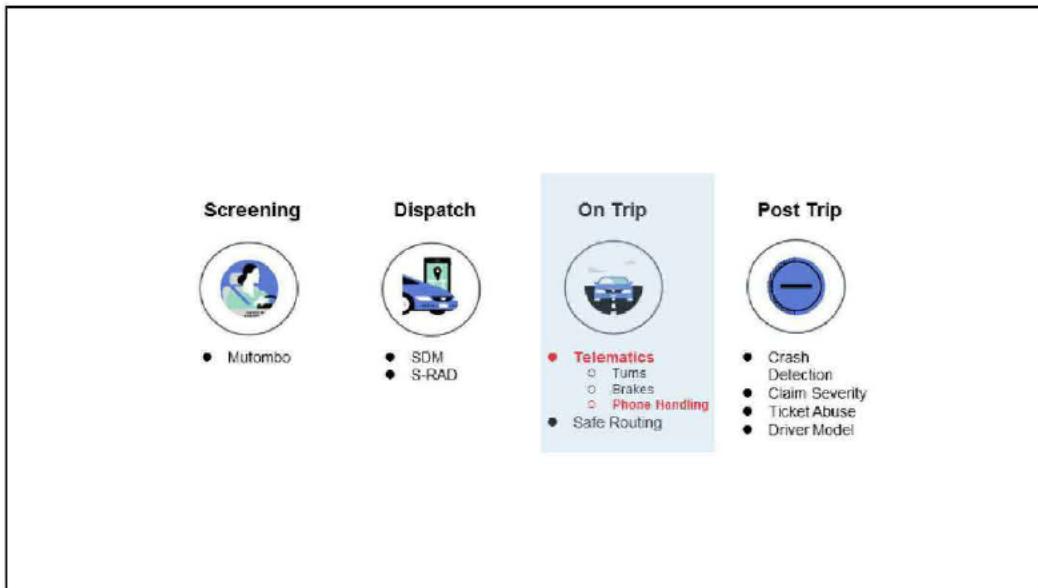


Low exposure ✕ High probability of damage



High exposure ✕ Low probability of damage







Boulder Data Collection

30+ phone devices



15+ phone mounts



15+ unmount events



Design
Launched on 6/14/2019

The image displays three screenshots of the Uber mobile application interface, arranged horizontally with arrows indicating a flow from left to right.

- Left Screenshot:** The "Notifications" screen. It shows three circular icons: "Samsung", "Huawei", and "Razer". Below the icons, a list of notifications is shown:
 - You received a deactivated driving ticket
 - Comics app
 - Immediately notifications
 - 4 notifications
 - Veronica, Facet
 - 4 notifications
 - Choose out these responses before you take your first trip
 - 1 review message
- Middle Screenshot:** A ticket warning message. It features a small image of a hand holding a phone while driving. The text reads:

Multiple tickets can lead to deactivation

Archie on a recent trip let us know they were unfortunately pulled over for using their phone while driving. Drivers of Uber and UberPool can't use their phone while driving, so please make sure to deactivate your account in part to avoid deactivation of your account.

[LEARN MORE](#)
- Right Screenshot:** A benefit of using a phone mount. It shows a hand holding a phone with a mount attached. The text reads:

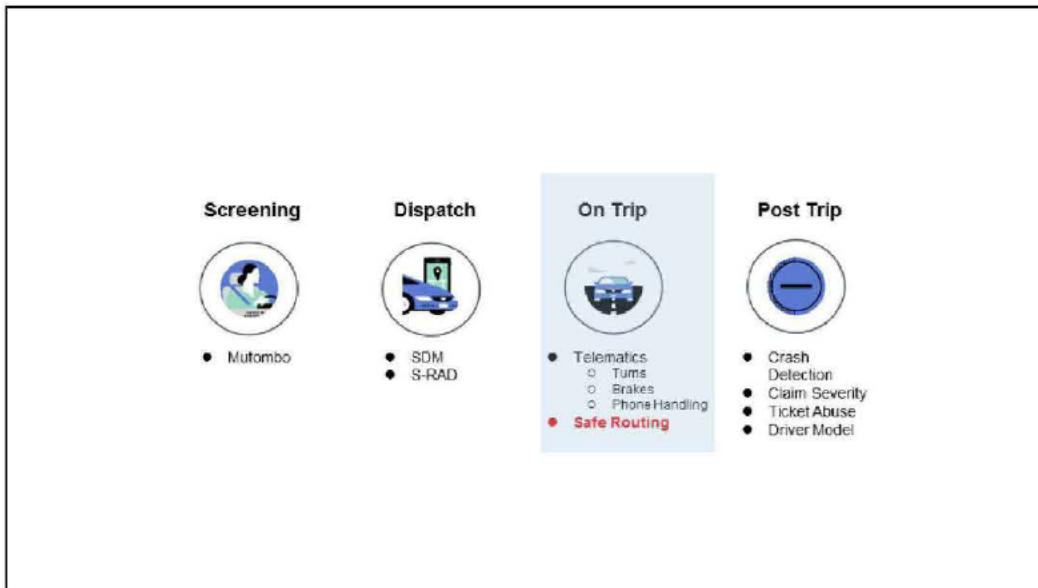
The benefits of driving with a phone mount

It's really really important to have an available phone mount in a phone mount in the car whenever you're driving the car.

Wikipedia on phone mount

Did you know that in every 1000 state drivers, 1000 are using their phones while driving. That means that using your phone while driving while using a phone mount could result in a relatively high value.

[LEARN MORE](#)



Safe Routing

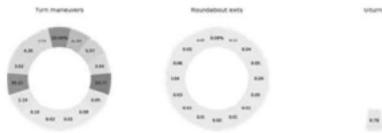
Available data

- Historic driving maneuvers suggested by Uber navigation
- Historic expected traffic conditions and speed
- Road features on route
- Safety outcomes

Goals

- Estimate safety penalties to be used in route finding
- Allow drivers to choose routes based on safety

Distribution of maneuvers in suggested Turn-By-Turn instructions during dropoff leg of US P2P trips 2019-08-14



Safe Routing

What makes a route risky?

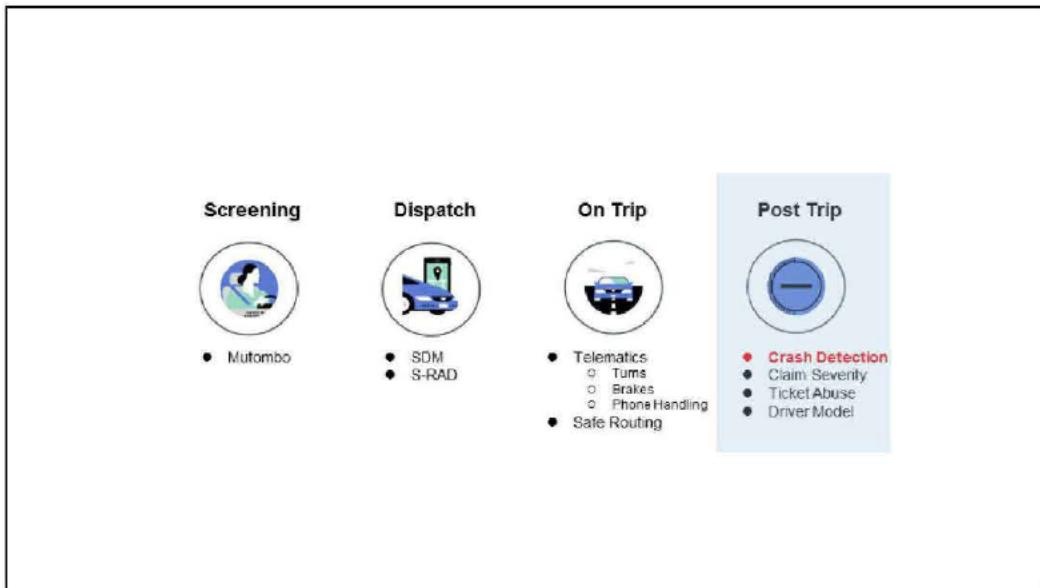
- Difficult maneuvers
- Busy roads
- Driving speed

Applications

- Recommend safer routes to drivers
- Ensure insurance pricing reflects safety of routes
- Allow drivers and riders to make decisions based on safety

3 features are enough to reveal an [REDACTED] in per mile collision risk

1. Expected trip distance
2. Expected trip duration
3. US State

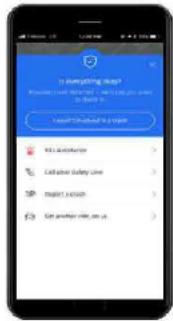


Crash Detection

Quickly detect potential crashes using ML & **proactively** support with empathy and care

- Fast response
- Fast driver reactivation
- Improve customer satisfaction
- Improve reputation for safety
- Insurance savings

Rider



Driver



Public Announcement on Sep 5, 2018

cnet TECH INDUSTRY Uber rolls out safety features, like AI that can detect crashes

THE SUN SAFETY FIRST Uber is turning your smartphone into an automatic CRASH detector

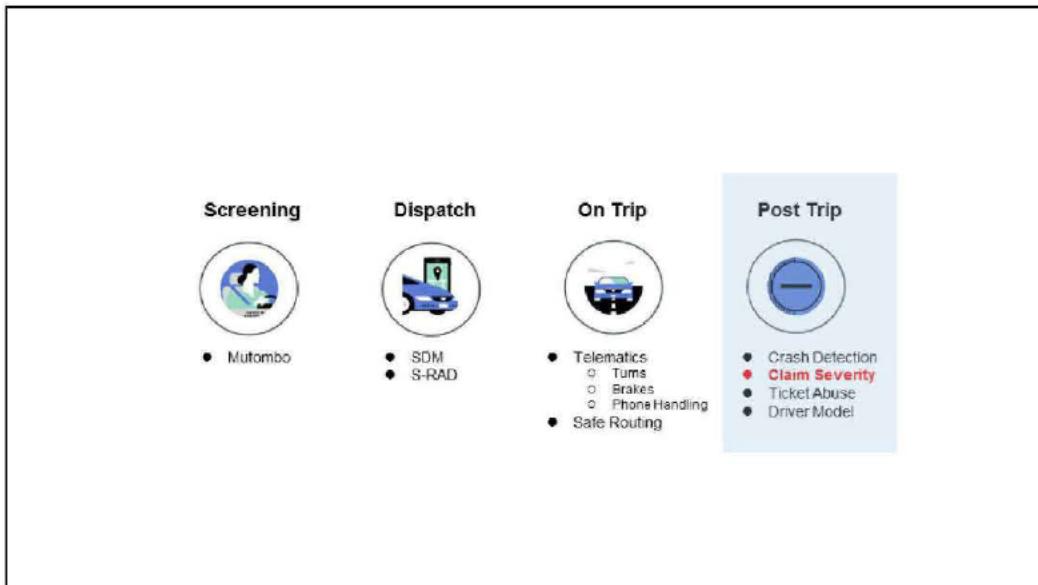
CNN tech BUSINESS CULTURE GADGETS **THE VERGE** TECH SCIENCE MITE

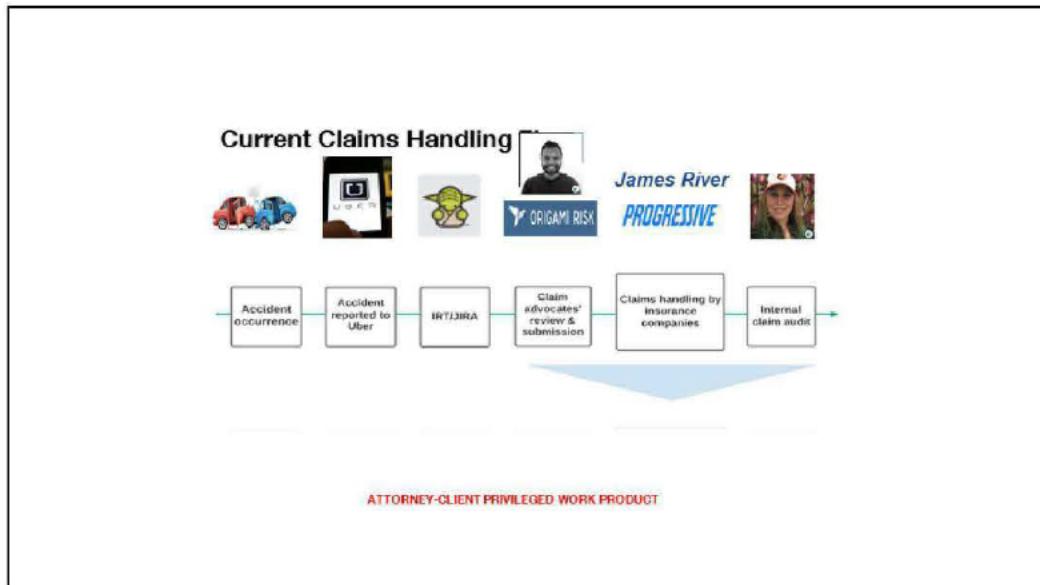
Uber will soon detect crashes

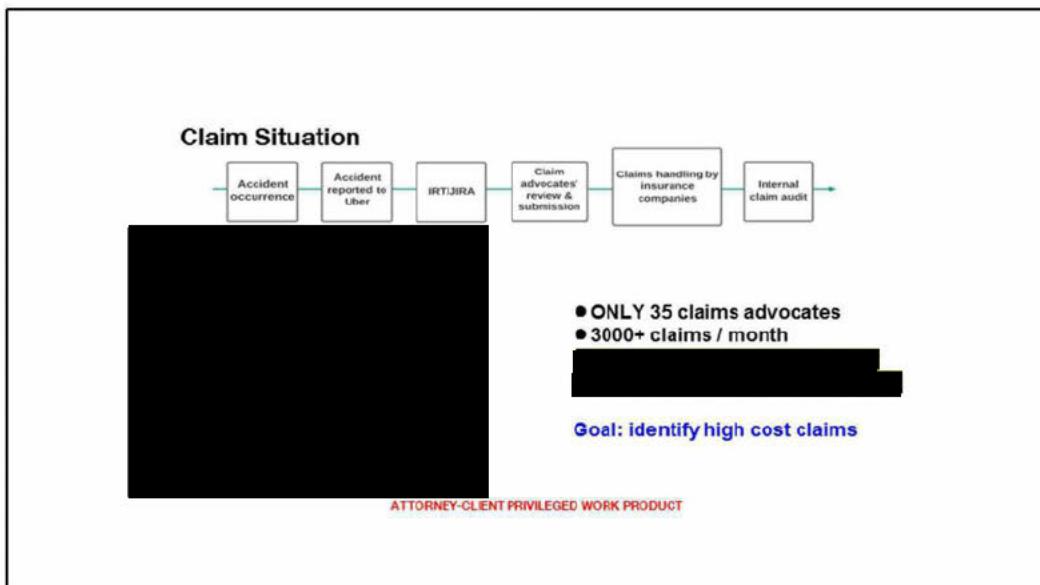
STAR September 22, 2018 **Uber is going to turn your smartphone into an automatic crash detector**

Uber's new app turns smartphone into an automatic crash detector

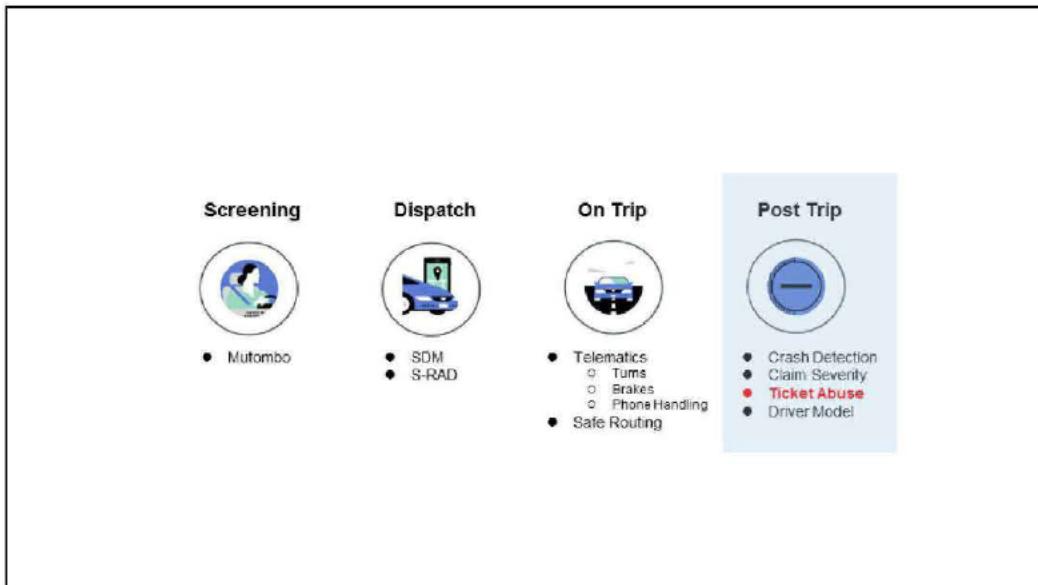






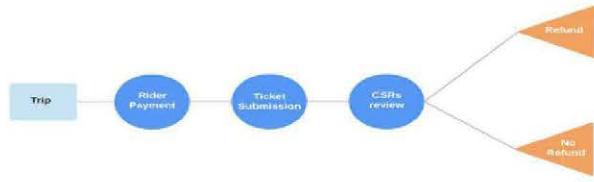






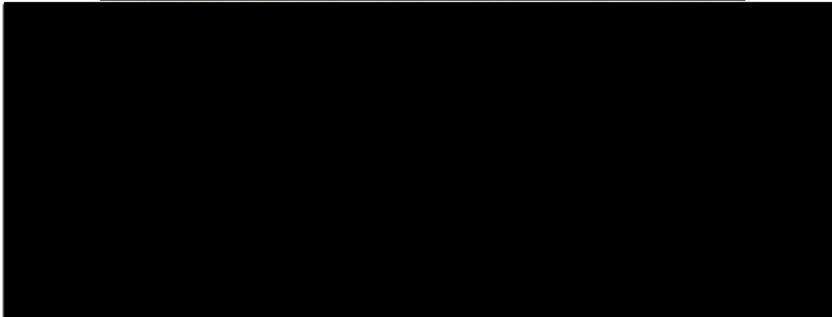
Rider Support Abuse - Overview

We build a ML model to detect rider support abuse (at rider account level) in the purpose of asking for refunds, timely and comprehensively, using ticket contextual data, rider behavioural data, and text.



Rider Support Abuse - Model Performance

- On average, [REDACTED]
- Annually, if we use the model results and keep the same trigger rate of the current policy, [REDACTED]



Process & Tools

- Data Science Workbench (DSW)
- Beeline (Hive)
- Query Builder
- Phabricator → Jira
- Coding
 - Scala
 - Python
 - R

Questions?

Insurance 101

Ford Lu

07

Today's Topics

- 01** Introduction
- 02** Insurance Coverages
- 03** Insurance Costs
- 04** Risk Retention

Introduction

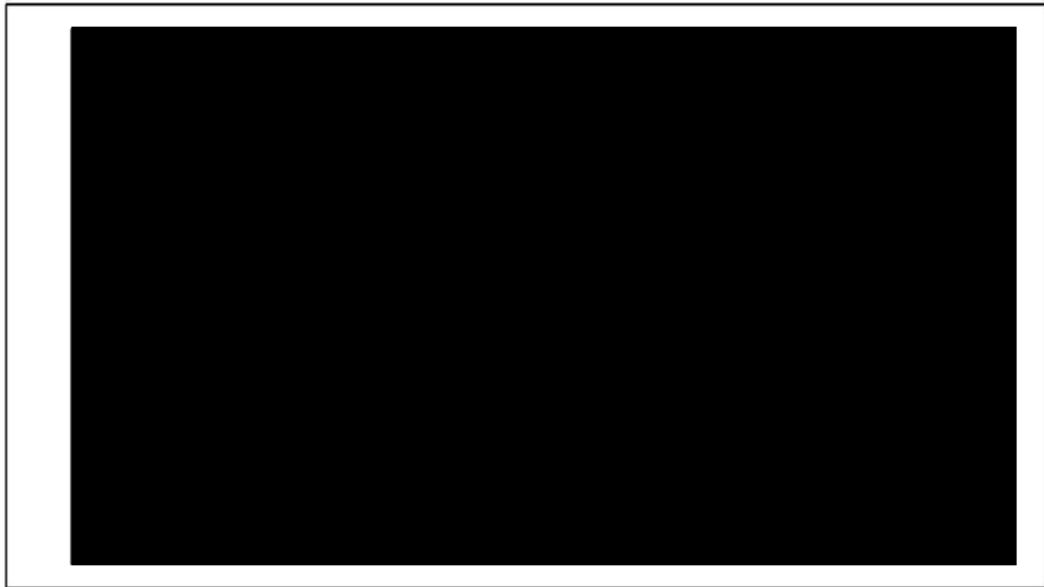
Insurance involves MANY teams!





For actuarial review only: [REDACTED]

2021 INTL Budget source: [REDACTED]



Casualty Overview

INTRO | CASUALTY OVERVIEW



Auto

- Owned / leased auto
- Non-owned auto (platform users)



General Liability

- Premises liability
- Product liability
- Physical assault / sexual misconduct
- Non-owned bicycles (couriers)



Workers Comp / EL

- Traditional employees
- ID / classification complaints
- On-the-job injury coverage for delivery partners



Directors & Officers

- Personal assets of D&O
- Company assets

See the 2020/2021 Global Casualty Report [here](#).

Auto Liability

AUTO & GL | **COVERAGE**

Insurance is foundational to the rideshare / TNC model

Transforming auto insurance from a fixed annual cost to a variable cost that is embedded in the economics of each trip has been the key to unlocking the part-time and flexible ridesharing model

Drivers don't need to purchase an expensive taxi policy to take their first ride

Blanket coverage enables consistent coverage and claims experience for all rides and huge reduction in administration and compliance costs

Rideshare insurance was new to insurers and difficult to place but much easier now with many carrier options



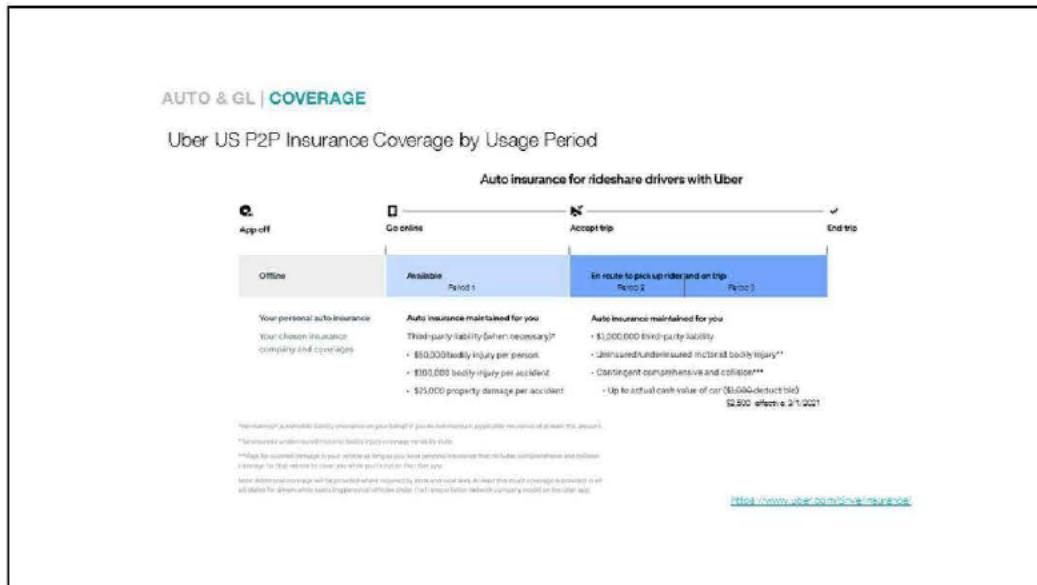
AUTO & GL | **COVERAGE**

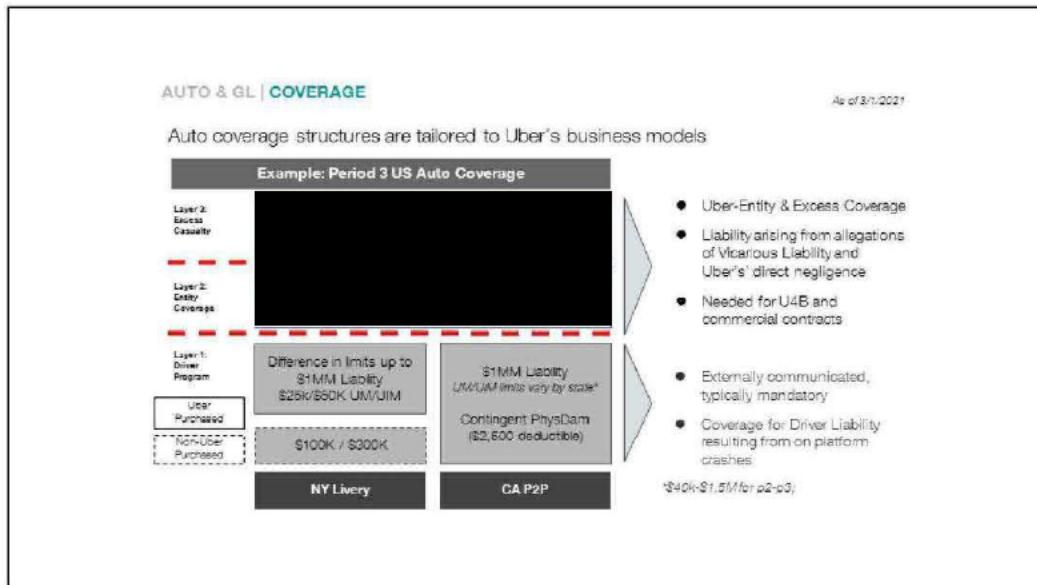
Livery	Rideshare / P2P / Eats
Generally full-time Commercially licensed	Generally part-time, seasonal No additional licensing required
Major Markets: Mexico, Europe, New York, Egypt	Major Markets: US, Brazil, Australia, Canada
Example: California Livery Insurance Costs	Example: California Rideshare Insurance Costs
Driver's annual insurance cost: \$6,000 Uber purchased auto coverage: \$0.10 per on-trip mile (Excess only)	Driver's annual insurance cost: [REDACTED] Uber purchased auto coverage: [REDACTED] per on-trip mile

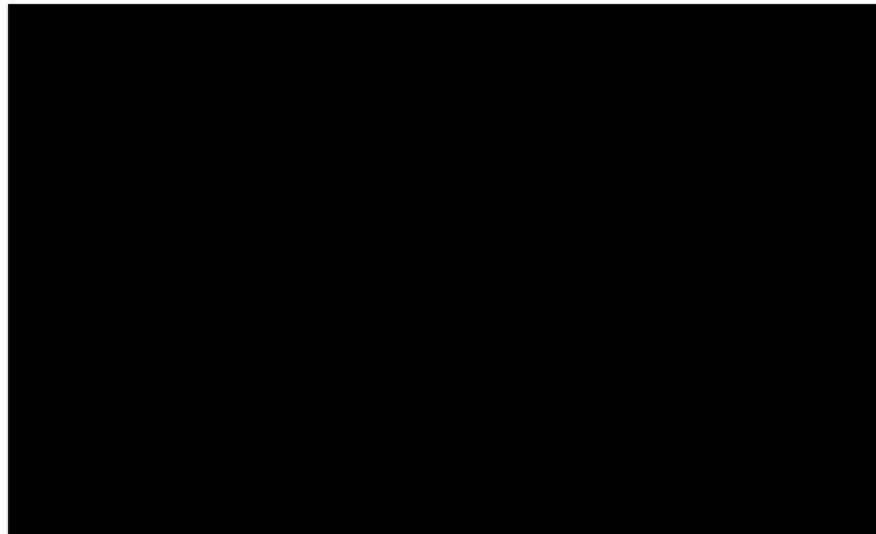
Rates as of 5/1/2020













US P2P mileage breakdown is prospective, based on expected 3/1/2021 renewal state mix (F1 2021 forecast version)

General Liability

GENERAL LIABILITY | **COVERAGE**

In addition to typical General Liability exposure, Uber also faces GL exposure to Physical Assault and Sexual Misconduct Liability.

Physical Assault

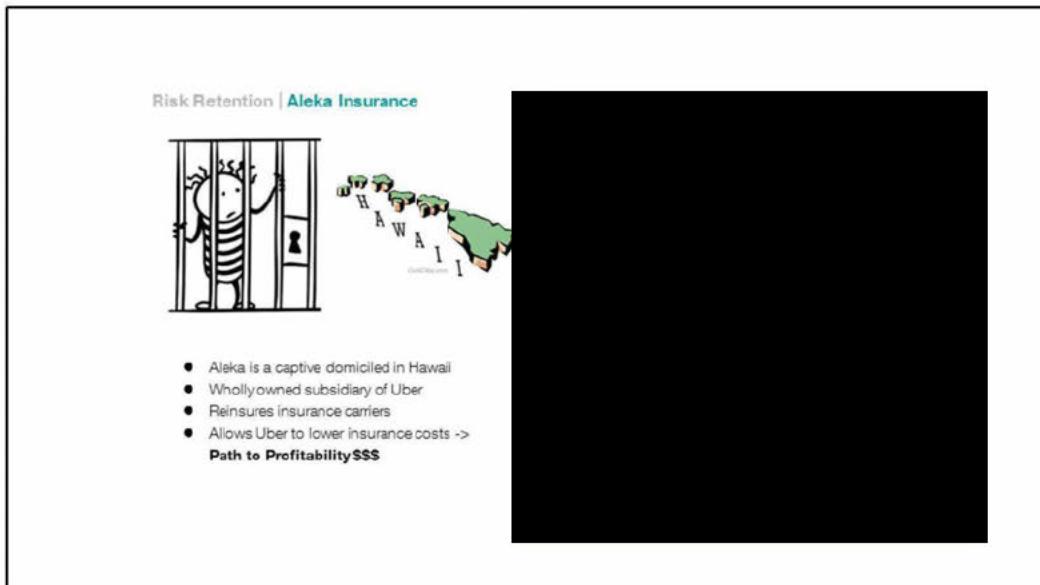
Sexual Misconduct Liability (SML)



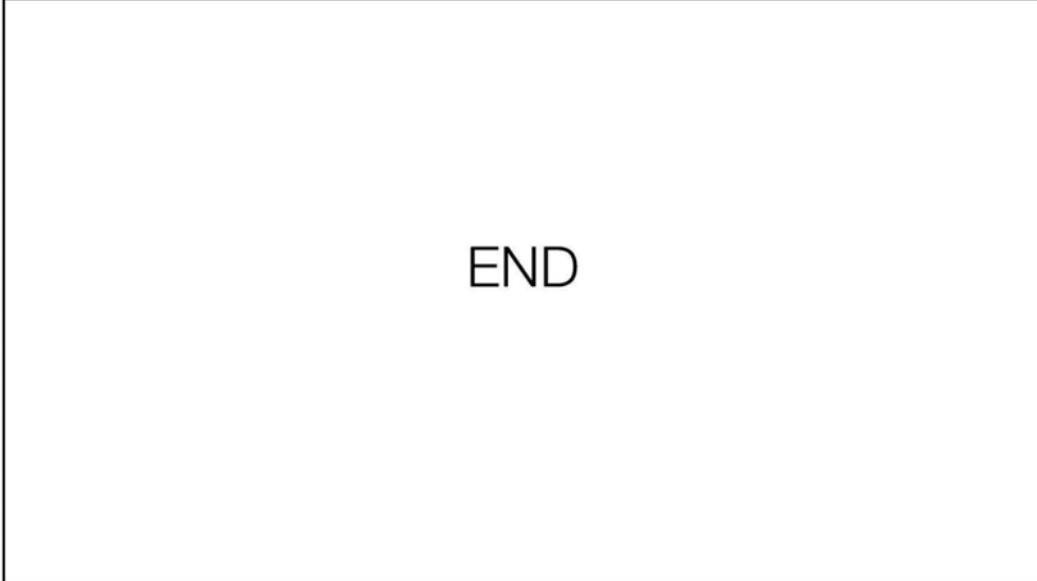
Mention: Product liability used to be included as well with JUMP

Risk Retention





Give an example of quota share reinsurance for CA P2P and example of excess of loss reinsurance



END

Why we experiment: The Philosophy

Data Driven Decisions



Enable Uber to move fast and distribute decision making by ensuring that every change is measured, monitored, and analyzed.

Scientific Method



Experiments must contain a clear hypothesis pointing to specific metrics, to avoid drawing opportunistic conclusions.

Shared Learning



Experimenters should be data-informed (not necessarily data-driven), and understand the shortcomings of any experimentation platform.

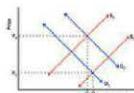
Where we experiment: Challenges

Mobile



Multiple apps and platforms create challenges with consistency.

Marketplaces

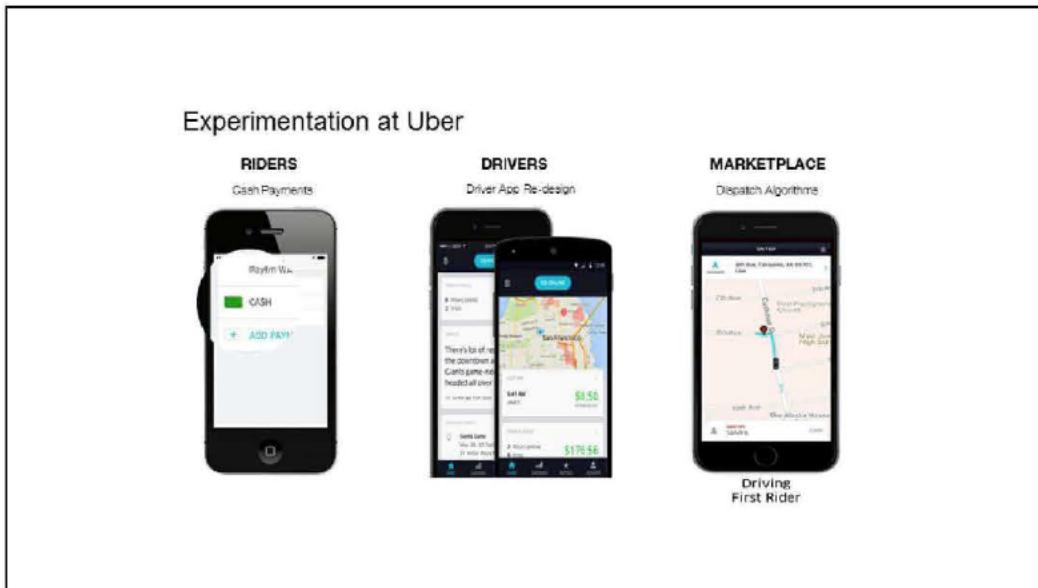


Hundreds of N-Sided Marketplaces agents moving in real-time creating strong Interaction Effects.

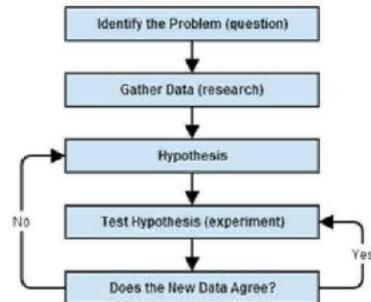
Backends



Experimenting across thousands of microservices, and thousands of features require performance and robustness.



What is Experimentation?



Experiment Methodology Types

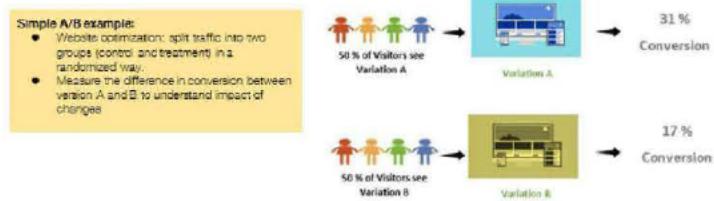
Randomized Experiments

- Randomization over treatment and control
- **A/B Testing**
 - A/B testing, multivariate tests e.g. ANOVA
 - Control and treatment groups do not change during the experiment duration
 - A/B experiments are most powerful technique available
- **Switchback**
 - pseudo A/B where control and treatment are switched over time when there are network effects

Observational Studies

- Purely observational with no randomization
- **Difference in Differences (Diff in Diff)**
 - Pre-post analysis to measure lift
 - Useful to analyze cohorts (e.g. trip completion of commuters)
 - Difficult to control external factors
- **Synthetic Controls**
 - Runs on entire market (e.g. SP)
 - Find similar markets to the treatment market as controls i.e. synthesize control markets
 - Less powerful than A/B
- **Surveys**
 - Send out pre and post survey to measure safety sentiment and product awareness

A/B Testing: An Example



A/B Testing: First Recorded Clinical Trial in History

Introduction:

- Scurvy was an epidemic resulting in lack of vitamin C in 18th century
- In 1740, close to 1,300 sailors died of scurvy aboard [George Anson's voyage](#)
- James Lind was a Royal Navy surgeon who studied treatments for scurvy on board the *Salisbury* at sea in 1747

Lind's hypothesis:

- Scurvy could be cured by acids, include dietary supplements of acids

Lind's approach:

- divide 12 sailors into six groups of two, give everyone same diet, but supplement with one of the following:
 - group 1: cider, 2: vinegar, 3: vinegar, 4: seawater, and 5: oranges and lemon, 6: barley water

Result:

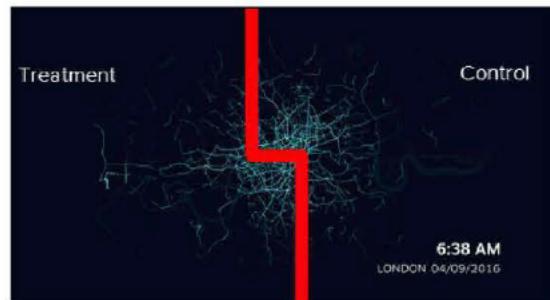
- group 5 recovered within a week



James Lind
Circa 1716- 94

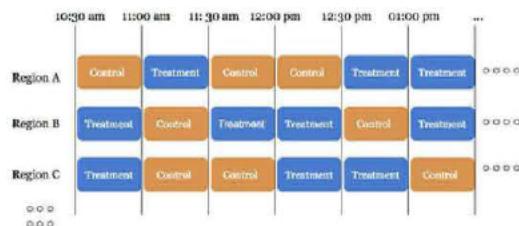
Switchbacks: Dealing with Network Effects

How to test pricing changes in a live city?



Switchbacks: Marketplace Experiments

- Control and treatment get switched over time to mitigate network effect
- Example: surge pricing experimentation - treatment units varies with time; no riders / drivers are disproportionately impacted
- Analysis: control and treatment units are aggregated at time-region units level and average values are compared
- Fun fact: first applied in agriculture in [cow lactation experiment](#)



Synthetic Controls: Creating Control in Experiments

- Synthetic Control Method: Create or synthesize 'control' in experiments, where everyone gets treatment in targeted region
- Example: anti-smoking ban legislation enacted in California in 1989 as part of Prop 99
- Can't do an A/B test since entire state of California is treatment
- In famous [study](#), the authors created synthetic California, which would exist if the legislation did not pass (aka synthetic control)
- an example synthetic California could be made of 50% Nevada, 30% Arizona, 15% New York and 5% Connecticut

California: Smoking per capita

Policy: - Actual Data
- Actual CA
- Synthetic CA (50% NV, 30% AZ, 15% NY, 5% CT)
- Synthetic CA (50% NV, 30% AZ, 15% NY, 5% CT) - Difference

Measured effect

Actual CA

expected CA w/o Legislation (synthetic control)

Experiment Design: The Process

- 1 Develop hypothesis and choose success metric(s)
- 2 Determine amount of desired lift in target success metrics
- 3 Calculate required sample size (power analysis)
- 4 Split data into two groups and expose treatment to one of the groups until you reach the required sample size
- 5 Analyze results

Experiment Design: Metrics

- 1. Success Metrics:** Typically the primary metric that will determine whether the new product or policy is successful which will directly impact rollout decisions.
Example: Rider on Driver Serious Interpersonal Conflict (IPC) rate on updated Safe Dispatch Model (SDM)

- 2. Guardrail Metrics:** Metrics and thresholds that indicate when additional monitoring is needed and possibly when the experiment needs to be stopped. Typically marketplace metrics (trip completion rate, cancellation rate, etc.)
Example: If the cancellation rate of a new product being experimented is greater than 10%, we will roll back the experiment.

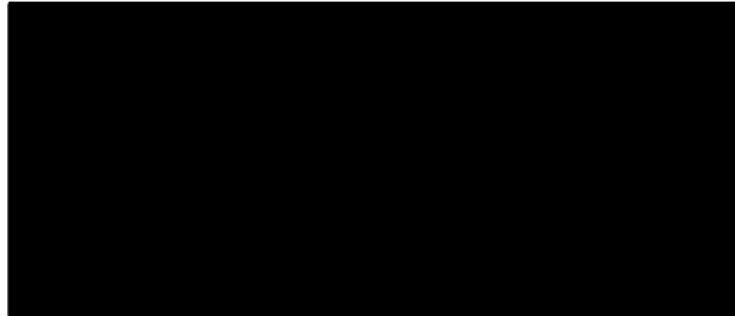
Experiment Design: Sample size (Power Analysis)

- Provides time (approx.) needed to complete the experiment based on the effect size we want to measure with **statistical significance**
- Power controls the type-II error
- Sample size and power are related: more sample size means more power
- Need to calculate sample size before the experiment start

		Reality		Relationship with Sample Size
		Positive	Negative	
Study Finding	Positive	True Positive (Power) (1- β)	False Positive Type I Error (α)	Inverse: smaller the effect size, the larger the required sample size
	Negative	False Negative Type II Error (β)	True Negative	Inverse: the lower the threshold, the larger the required sample size
		Power / Sensitivity		Direct: larger the Power, the higher the required sample size

Surveys

- Send out surveys to measure safety sentiments- "Uber is committed to Safety" and product awareness
- Typically sent twice- **before** and **after** the experiment is conducted
- Measure the difference in sentiment pre and post experiment / product rollout.



Experimentation Tools



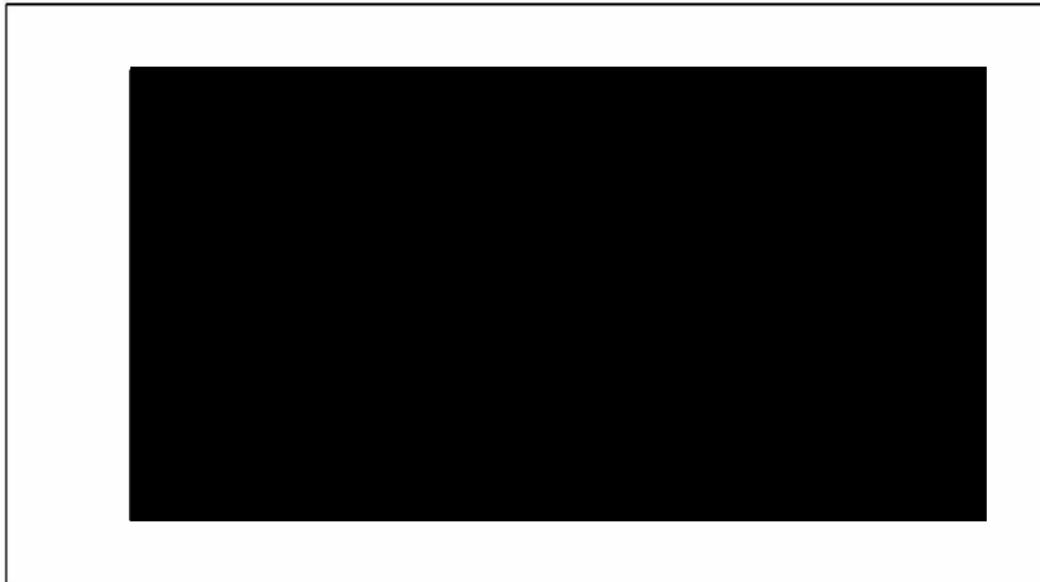








Example experiments

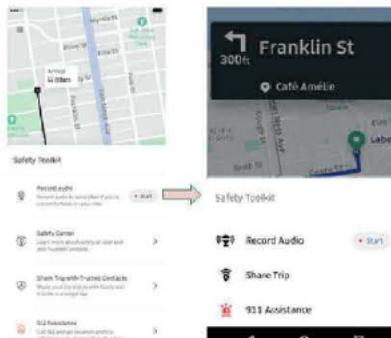




On Trip Audio Recording

Audio Recording User Experience

- Available to both riders and drivers
- Encrypted and stored on the device
- Rider or driver cannot listen to recording
- Uber has no access until users send it to us



The image shows a screenshot of the Uber app's Safety Toolkit. At the top, there is a map showing a route from a starting point to a destination on Franklin St. Below the map, a large button labeled "Safety Toolkit" is visible. To the right of this button, there is a "Safety Toolkit" interface with a "Start" button. Below the "Safety Toolkit" interface, there are several other safety features listed: "Safety Center" (with a "Start" button), "Share Trip with Trusted Contacts" (with a "Start" button), and "SOS Assistance" (with a "Start" button). At the bottom of the interface, there are three navigation icons: a left arrow, a circle, and a right arrow.



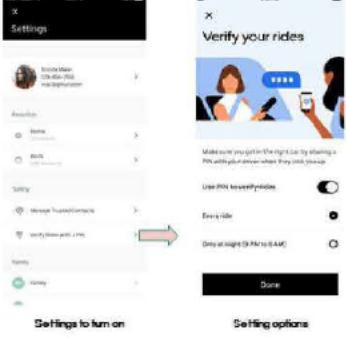


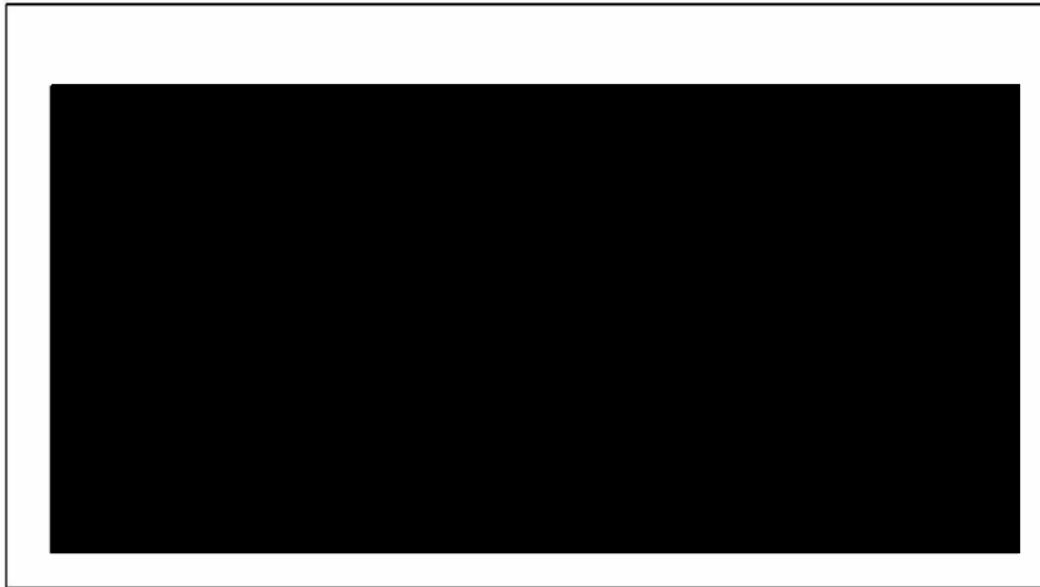


Verify Your Ride

PIN User Experience

- Turn on in settings
 - Users can set up this feature from the safety section of their settings
- Unique PIN on every trip
 - A unique PIN will appear on the driver match card for every trip that Verify Your Ride is turned on for







How to get help



- Engdoc [REDACTED]
- Wiki pages: [REDACTED]
- Internal Stackoverflow: [REDACTED]
- Slack channel for [REDACTED]
- Email: xp@uber.com
- blog post:
 - <https://eng.uber.com/xp/>
 - <https://eng.uber.com/experimentation-platform/>
 - <https://eng.uber.com/xp-background-push/>
 - <https://eng.uber.com/autonomous-reasons-regression-analysis/>

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